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CEMENT and ENGINEERING NEWS (Est. 1896)

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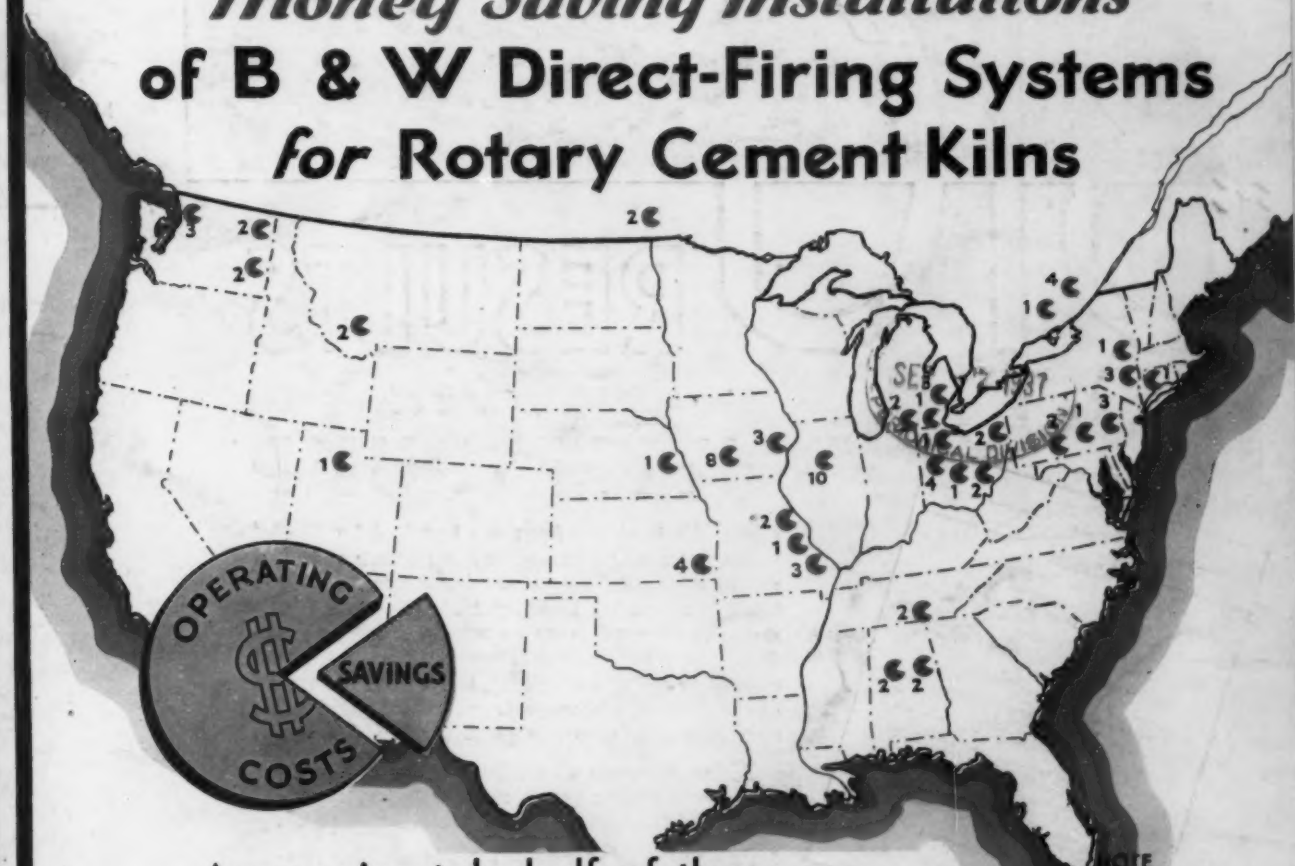
***for* Rotary Cement Kilns**



Approximately half of these systems represent repeat orders.

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Which is consolidated with the journals

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Founded 1896 Est. 1918

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RECOGNIZED THE WORLD OVER AS THE LEADER IN ITS FIELD

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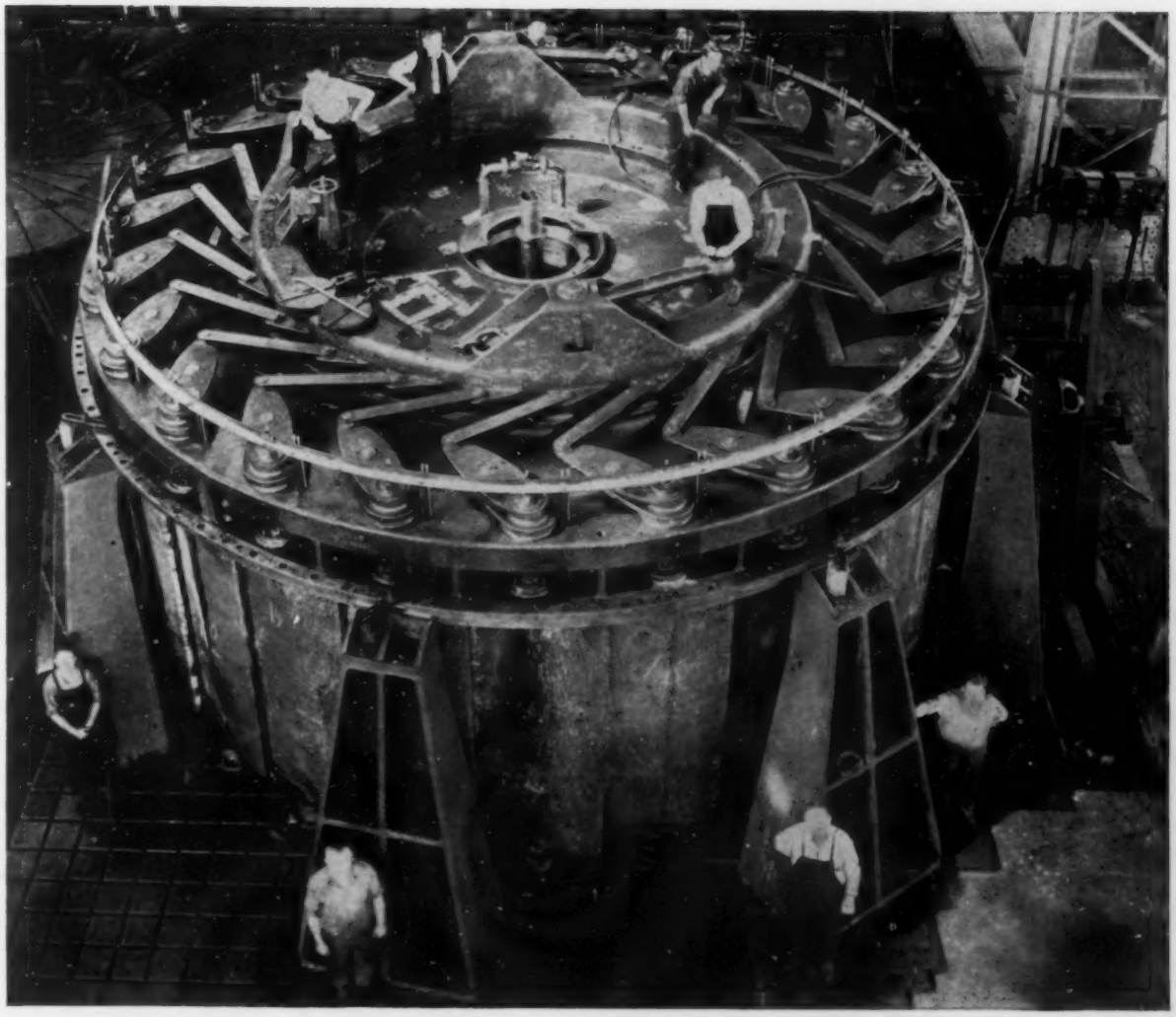

IT DRINKS RIVERS

A typical example of Goodrich development in rubber

THROUGH the openings in this huge turbine, set at the base of Wheeler Dam, the Tennessee River roars and rushes. Around spins the turbine, which turns a shaft three feet in diameter, and this shaft turns an electrical generator.

With the shaft bearing surrounded by water it would be awkward and troublesome to lubricate with oil or grease. In the past, wood bearings (water lubricated) have been used, but grit in the river water cut into the wood, scored the shaft, led to costly replacement.

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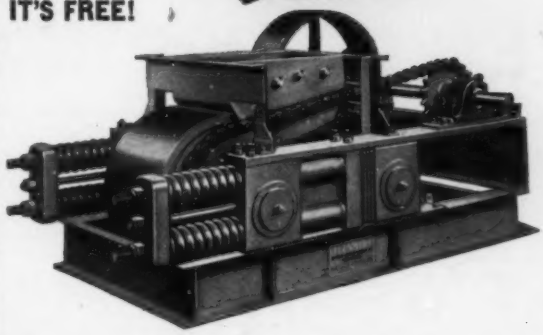

● This new illustrated book is full of useful information on roll crushers. Their advantages and disadvantages in secondary crushing are impartially discussed.

Is the roll crusher economical in first cost? Is it well adapted to portable use? What is its place in a gravel plant? Is it capable of large output at small ratios of reduction? What about the feed? Is it efficient at reductions in excess of 3 to 1? When are roll crushers not recommended? These questions are answered in this new Telsmith publication.

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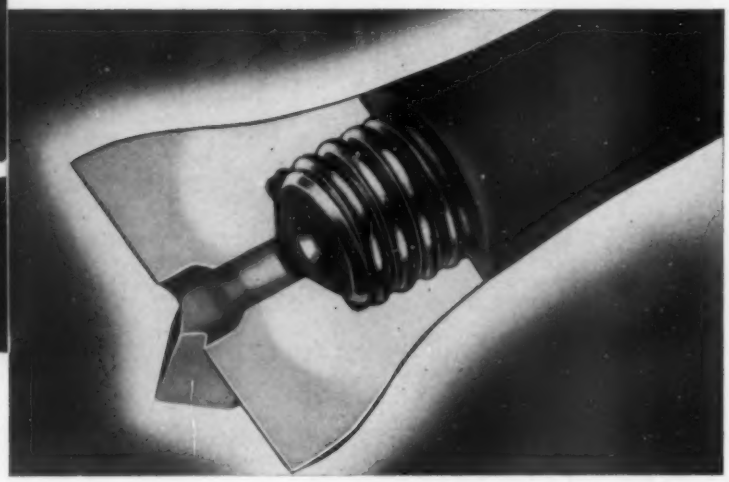

HIAWATHA. Timken Bearing Equipped streamlined flyer of the Milwaukee Road

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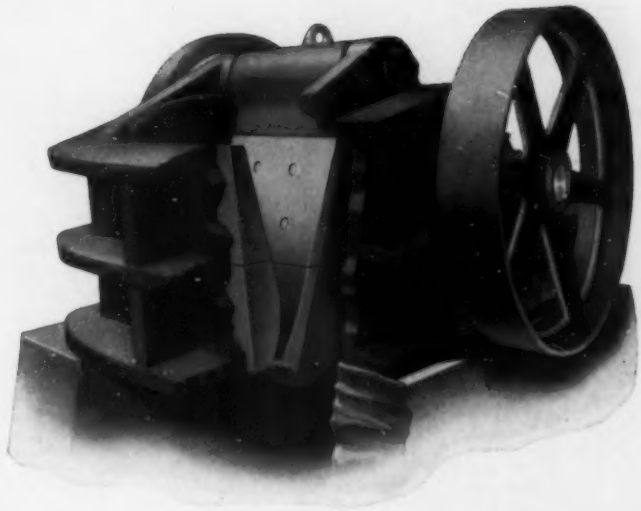

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Air hose troubles used to be a pretty regular thing in the underground operations of the Heumader Quarries Company, St. Joseph, Missouri. Constant dragging over the sharp rocks caused severe abrasion and rapid cover wear. Lubricating oil passing through the lines caused the tube to swell and flake, frequently clogging the hammers and delaying the work. Several different makes of hose were tried, but *the maximum service was only one year!*

GTM Says "Style M"

Noting these conditions carefully, the G.T.M. recommended that the quarry change to Goodyear Style M Air Drill Hose, 4-ply, and in May 1933, several lengths were put into service on the hammers. *Today, over four years later, this hose is still in use and, as the photograph shows, it is far from worn out. In all this time there have been no shut-downs and delays due to clogged tools, and the saving in replacements has reduced the company's air hose bill 75%.*

Couldn't you use savings like that? To give you similar economy on any type of job Goodyear makes five different types of air hose to fit every service requirement. The G.T.M. will be glad to recommend the proper type for your operation if you will write him, care of Goodyear, Akron, Ohio, or Los Angeles, California—or the nearest Goodyear Mechanical Rubber Goods Distributor.

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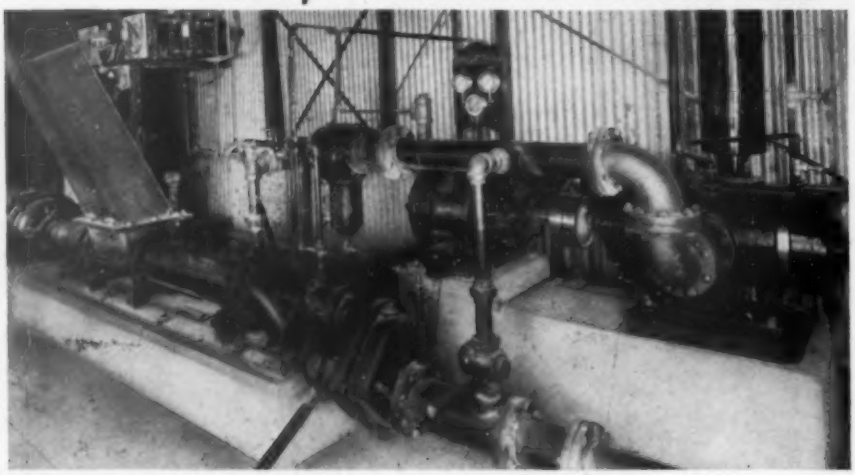

Fuller Rotary Single-Stage Compressor supplying air to a Fuller-Kinyon cement pump. Note the compact layout and small space required for this installation

FULLER-KINYON PUMPS AND FULLER ROTARY COMPRESSORS

WHEN conveying cement and other dry pulverized materials, the power required should be controlled by two factors only . . . quantity of material and conveying distance. Both of these are usually variable.

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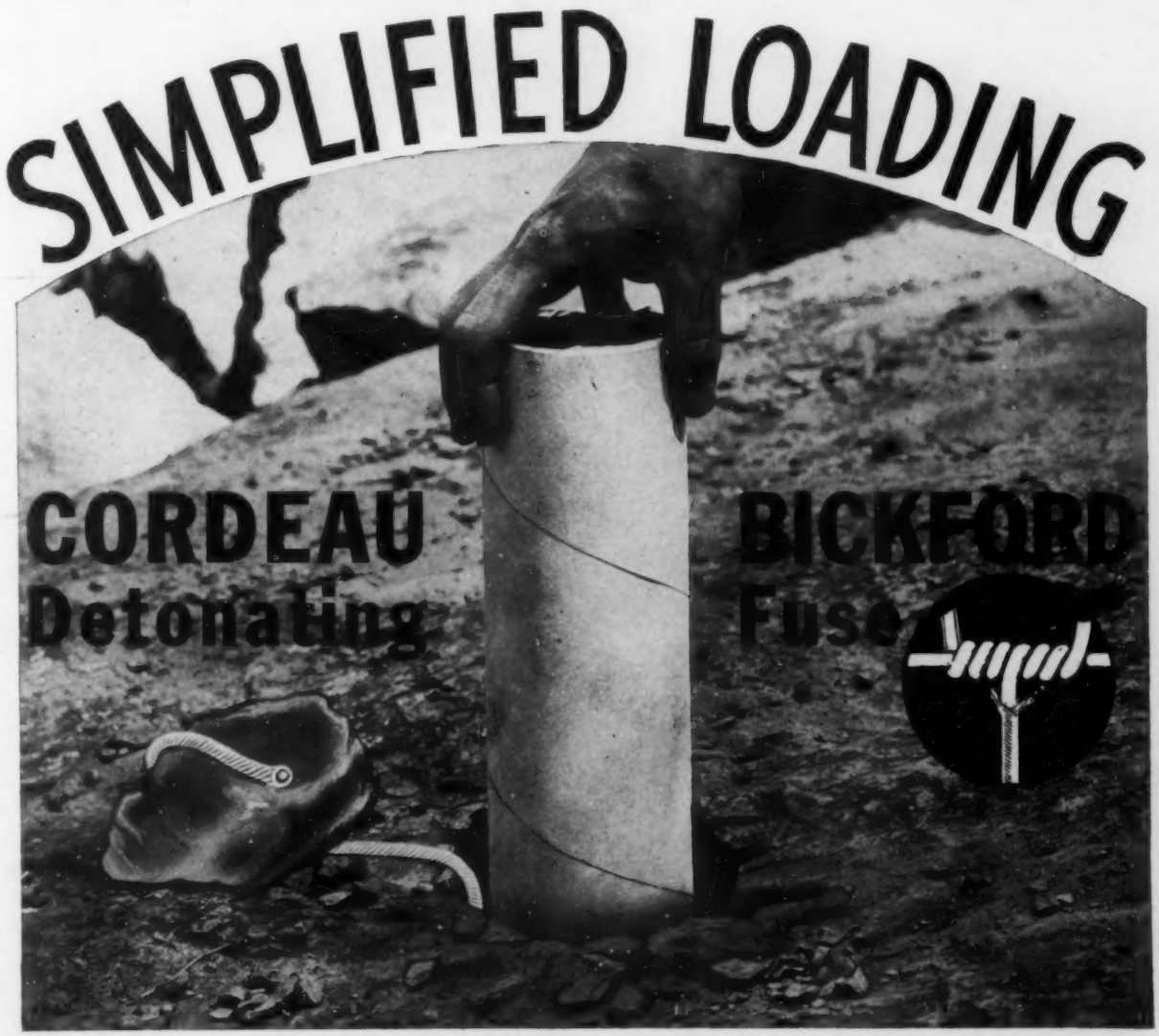

Tough Rope for Tough Jobs

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This is the same Yellow Strand that has been "taking it" successfully for many years—the same specially drawn wire, tested and selected—the same careful manufacture by the same company that is now *61 years young*.

The difference results from preforming, which sets the strands to the helical form they maintain permanently in the finished rope. Thus "Flex-Set" Preformed Yellow Strand is largely pre-broken in. It is limp—easy to handle and install—highly resistant to kinking, fatigue and wear.

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BRODERICK & BASCOM ROPE CO., St. Louis

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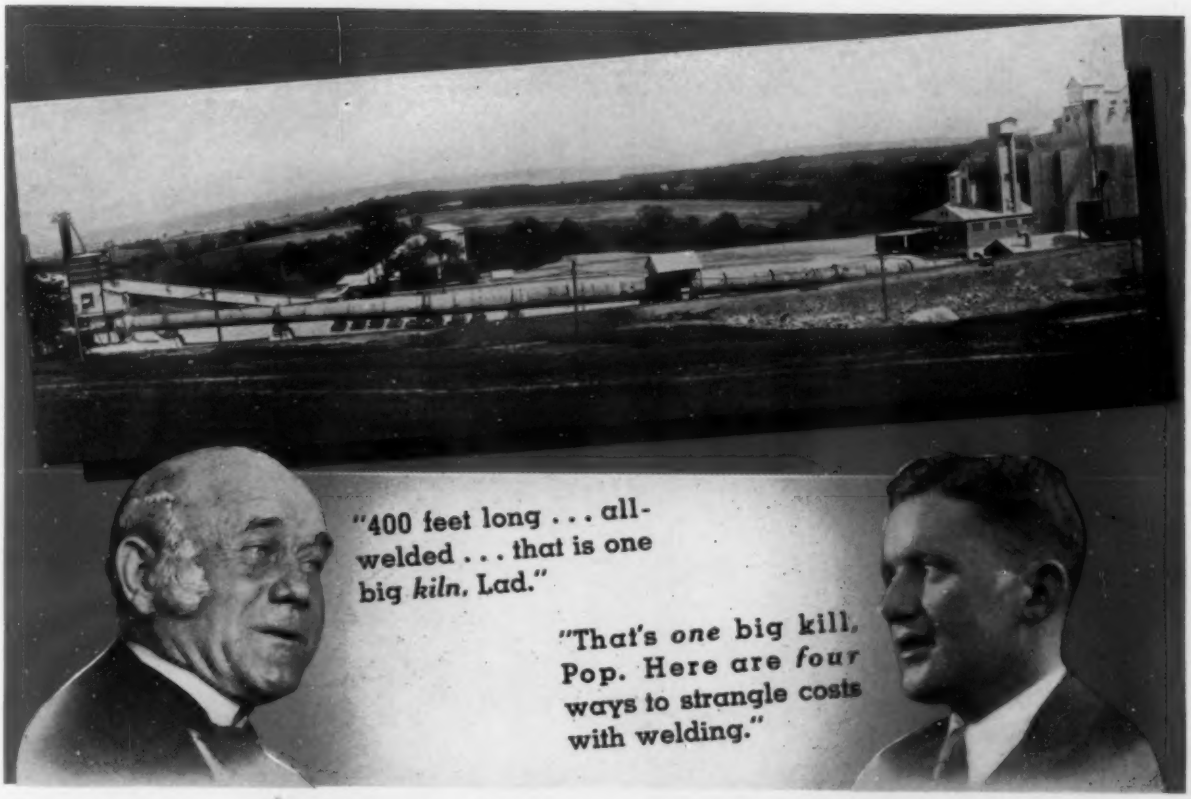
"Flex-Set" Preformed YELLOW STRAND



At the Chemical Lime Co., Bellefonte, Pa. A 400 ft. all-welded kiln, capacity 200 tons of lime per day. Has a total of 21 sections, shielded arc welded from 7/8" steel plate with Lincoln equipment by Traylor Eng. & Mfg. Co., Allentown, Pa.

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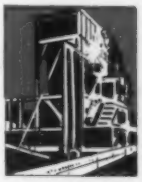

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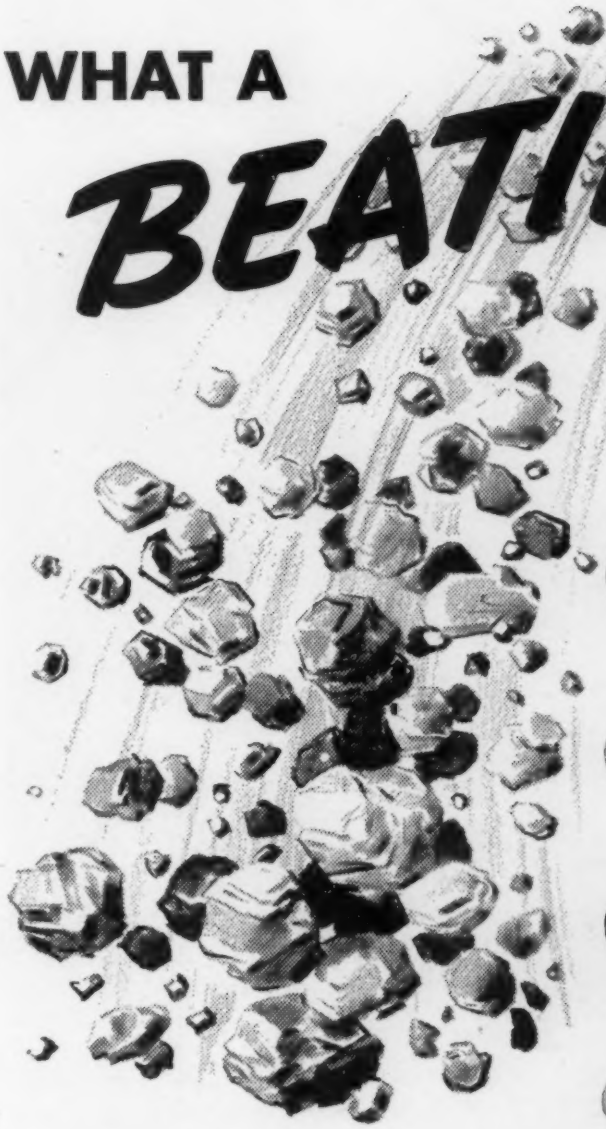
Expert help from Gilmer engineers, the men who build only belts.

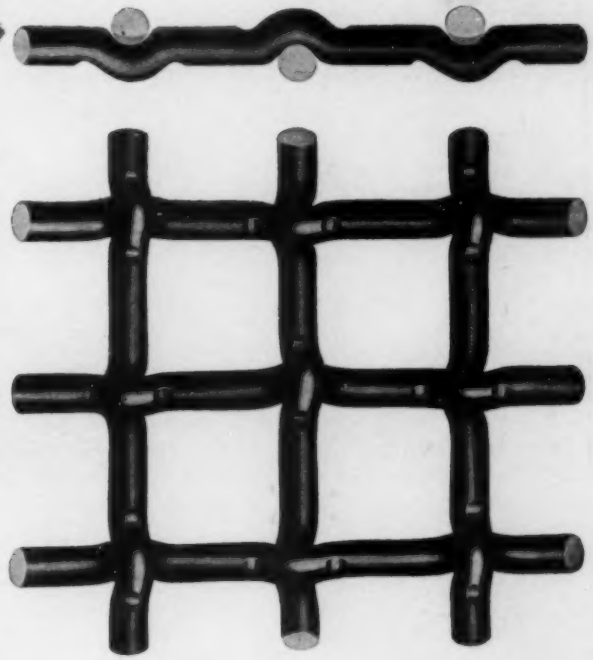
L. H. GILMER COMPANY, Tacony, Philadelphia

THE OLDEST FIRM OF RUBBER FABRIC BELT SPECIALISTS

WHAT A BEATING!

HOW LONG DOES YOUR SCREENING STAND IT?





ABRASIVE TORRENTS of stone and gravel... constant vibration. Only screening with a maximum of toughness and stamina built into the wire itself can take this beating and give maximum life.

Making wire to withstand tough service conditions has been Roebling's business for over 90 years. If your screening problem is resistance to vibration and abrasion, let us put this long experience to work for you.

Roebling Wire Screening is made for every sizing, cleaning and grading service.

JOHN A. ROEBLING'S SONS COMPANY
TRENTON, N. J. *Branches in Principal Cities*

ROEBLING *Wire Screen*

TRADE JERSEY MARK

90 YEARS OF WIRE MAKING SPELLS THE DIFFERENCE

UTAH

Positive Electro Magnetic Vibrating Screen

THE UTAH Electro-Magnetic Vibrating Screen was developed about four years ago and since then about fifty units have been put in service. It is a new type of screen, with very low power consumption (0.4 to 0.7 kw for a 4′x6′ screen). Dual magnets, supplied with current from a small bank of copper oxide rectifiers which splits the alternating current wave, give equal and positive motion in opposite directions.

Complete information on these new screens is given in Leaflet 2247. Why not write for your copy now?

781

EQUIPMENT ENGINEERED TO INDUSTRY

ALLIS·CHALMERS

MILWAUKEE WISCONSIN

THE LIME MANUFACTURERS' BIBLE

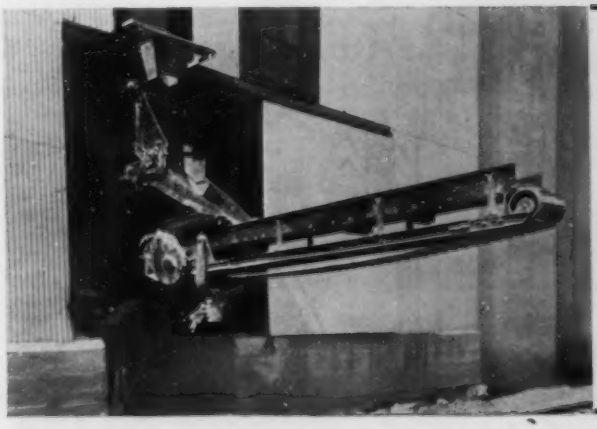
Often has ROCK PRODUCTS been referred to by lime manufacturers as their "Bible."

And with reason. For with the same steady, unwavering intent toward the utmost service to all the industries covered, ROCK PRODUCTS has ever used its expert knowledge and facilities for the good of the lime industry.

It is fitting then that ROCK PRODUCTS should be the first to describe, with the consent and approval of the owners, the latest, and in many respects the most remarkable, lime plant in the world—that of H. E. Millard, Annville, Penna.

In the following sepia pages are the selected advertisements of most of the principal concerns whose knowledge, experience and equipment made this plant possible. No other recommendation is necessary.

The story begins on page 45



Manierre Box-Car Loader

Cuts Costs and Saves Time

H. E. Millard installed a MANIERRE box-car loader mounted on a full swivel so that it can be rotated 180-degrees for loading lime into trucks in the bin storage building or into the most remote corners of box-cars on the siding. This installation makes possible the loading of three tons per minute or a carload in about ten minutes.

Let us show you how you can cut your loading time and decrease your costs.

Manierre Engineering and Machinery Co.

MILWAUKEE WISCONSIN

Rotary Kiln Efficiencies

FLS

The modern efficient Unax Rotary Kiln for calcining lime is the result of our many years experience in manufacturing and engineering hundreds of Rotary Kilns in such industries as cement, ore, lime, chemical, etc.

The Unax Cooler is integral with the kiln and provides efficient cooling of the calcined material by means of the air for combustion which thereby becomes preheated to a high degree.

The kiln illustrated is installed in the lime plant of H. E. Millard, Annville, Penna.

F. L. Smidth & Co. are manufacturers of Rotary Kilns, Coolers, Grinding Machinery and auxiliary apparatus, and in addition are Engineer Specialists in designing and equipping plants employing such machinery.

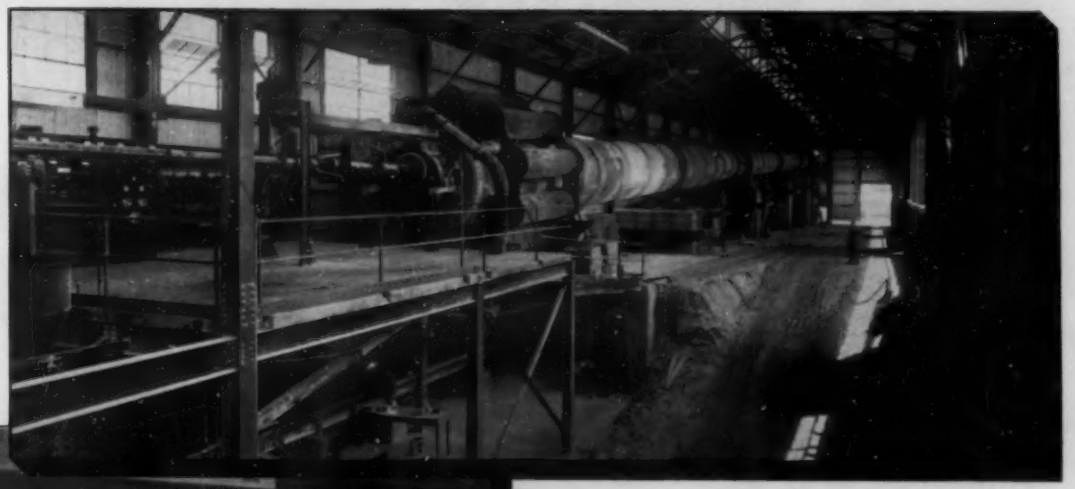
F. L. SMIDTH & CO.

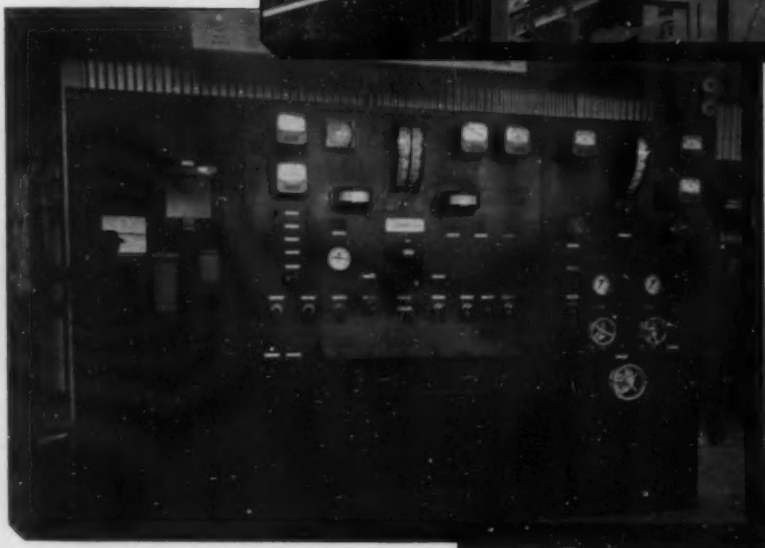
Engineers.

225 BROADWAY NEW YORK, N. Y.

Adapted to Lime Industry

FLS

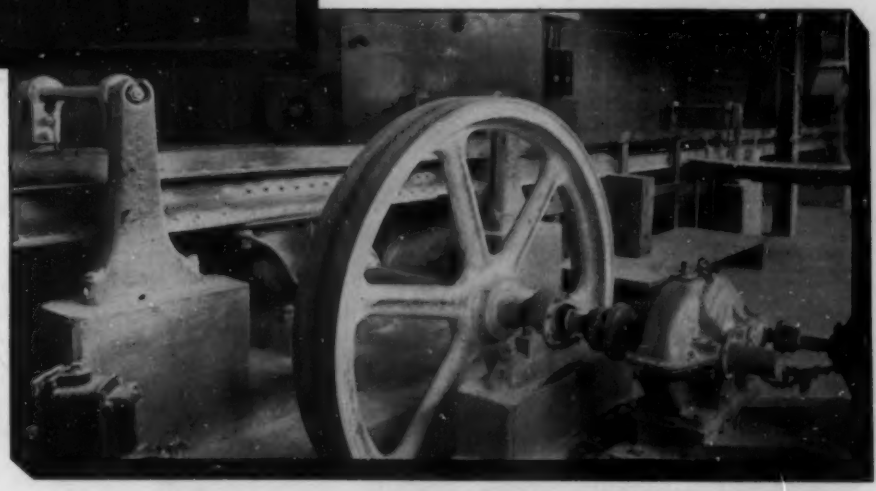




The FLS Centralized Kiln Control concentrates at one convenient point the control switches of the kiln and auxiliary equipment, sequence interlocks, alarms, signals, and instruments showing speeds, drafts, temperatures, etc., constantly presenting to the kiln operator a clear, quick picture of the kiln's operation.

The FLS Gas Analyzer permits obtaining complete combustion of the fuel while avoiding excess air in the kiln.

The Skipulter, shown below, is a shaker conveyor for transporting lime, clinker, etc.



The advantages of the Unax Rotary Kiln are:

Low Fuel Consumption.

Reduced cost of production.

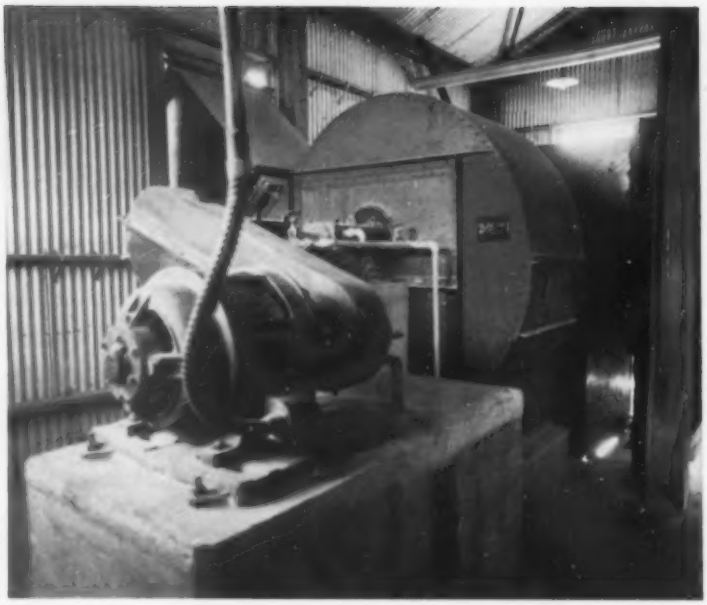
Better quality and greater uniformity of product.

F. L. SMIDTH & CO.

Engineers.

225 BROADWAY NEW YORK, N. Y.

"Buffalo" Induced Draft Fan



Buffalo Forge Company Induced Draft Fan driven by silent chain at H. E. Millard Lime Plant, shown above.

CONTROLS AND MAINTAINS UNIFORM BURNING CONDITIONS IN THE NEW H. E. MILLARD LIME PLANT KILN . . . . . .

This Buffalo" installation is only one of many where the most severe operating conditions prevail and where high efficiency is a requisite.

Uniform burning conditions are effected at this plant by pulling the air through the full length of the kiln and discharging it through the stack at an extremely low stack temperature. Also the secondary air is preheated for combustion.

We design and build all sizes of special fans for pressures up to 50" to 60" static pressure. Temperatures up to 1,000 degrees to 1,200 degrees F. may be handled. Built-to-order designs mean best efficiencies and operating speeds suitable for direct connection to standard motor speed.

We invite you to take advantage of our 50 years of world-wide experience in solving all types of fan problems.

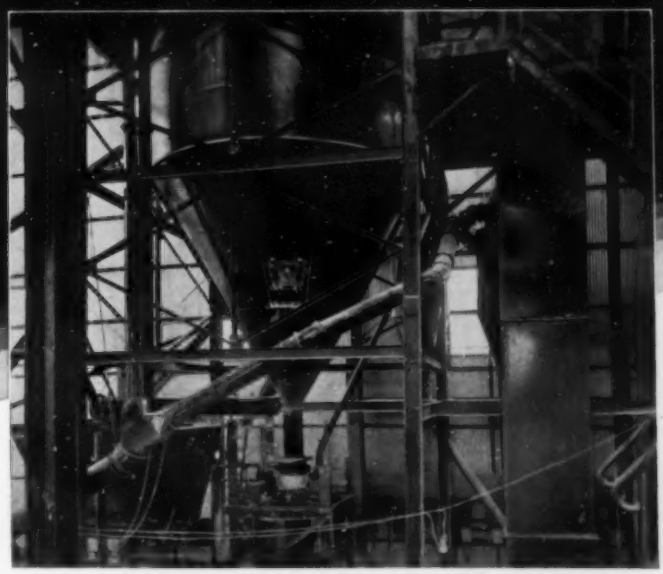
BUFFALO FORGE COMPANY

502 BROADWAY BUFFALO, N. Y.

Branch Offices in Principal Cities
In Canada: Canadian Blower & Forge Co., Ltd.
Kitchener, Ont.

GAYCO

CENTRIFUGAL *Air* SEPARATOR



. . . Selected by H. E. Millard for Producing His Finest Product . . . . .

Hydrate of a fineness of 99% through the 325-mesh sieve is made through this 14-foot Gayco.

This unit is deserving of the serious consideration of every operator interested in increased capacity of all types of grinding mills and in higher quality of finished product.

The new GAYCO Centrifugal Air Separator will separate practically all dry fine materials including many that are too sticky to be screened.

The principle of rejecting the coarse particles by means of an adjustable centrifugal sizing fan is an exclusive GAYCO feature.

We also manufacture Bucket Elevators — Bin Gates — Belt Conveyors — Feeders — Grizzlies — Rock Crushers — Revolving Screens and furnish complete crushing, screening and washing plants for crushed stone or sand and gravel.

Ask our engineers how the GAYCO Centrifugal Air Separator can pay for itself in your plant.

Universal Road Machinery Co.

MAIN OFFICE
AND FACTORY
KINGSTON, N. Y.

LABORATORY
KINGSTON, N. Y.

GAYCO

RUBERT M. GAY - DIVISION
114 LIBERTY STREET
NEW YORK, N. Y., U. S. A.

GAYCO

"GAYCO" CENTRIFUGAL SEPARATORS

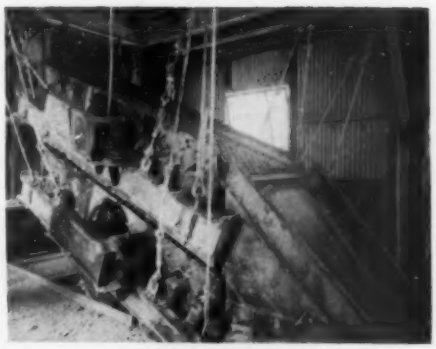
"RELIANCE"
CRUSHING, SCREENING
AND
WASHING EQUIPMENT

Look at the record!

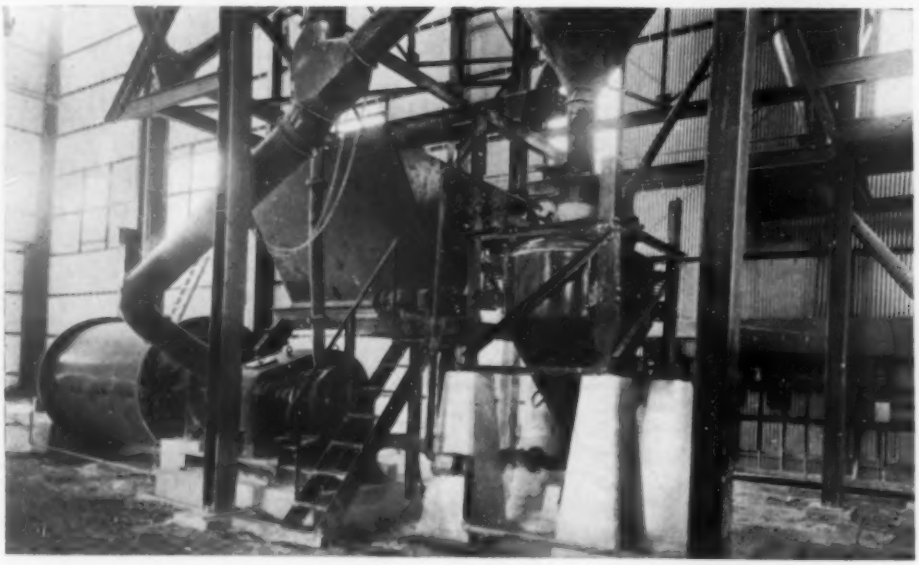
H. E. MILLARD

OPERATES

16 KENNEDY GEARLESS PRIMARY AND SECONDARY CRUSHERS



7 KENNEDY VIBRATING AND REVOLVING SCREENS



Hydrated Lime Grinding and Transport Equipment

Comprising Kennedy Gearless Air Swept Mill and Kennedy Pneumatic Transport System

Kennedy Feeders, Conveyors, Elevators, Classifiers and Bin Gates Are Also Installed in Millard Plants

CONSULT US FOR PRODUCING BETTER CRUSHED AND PULVERIZED PRODUCTS AT LOWER COSTS

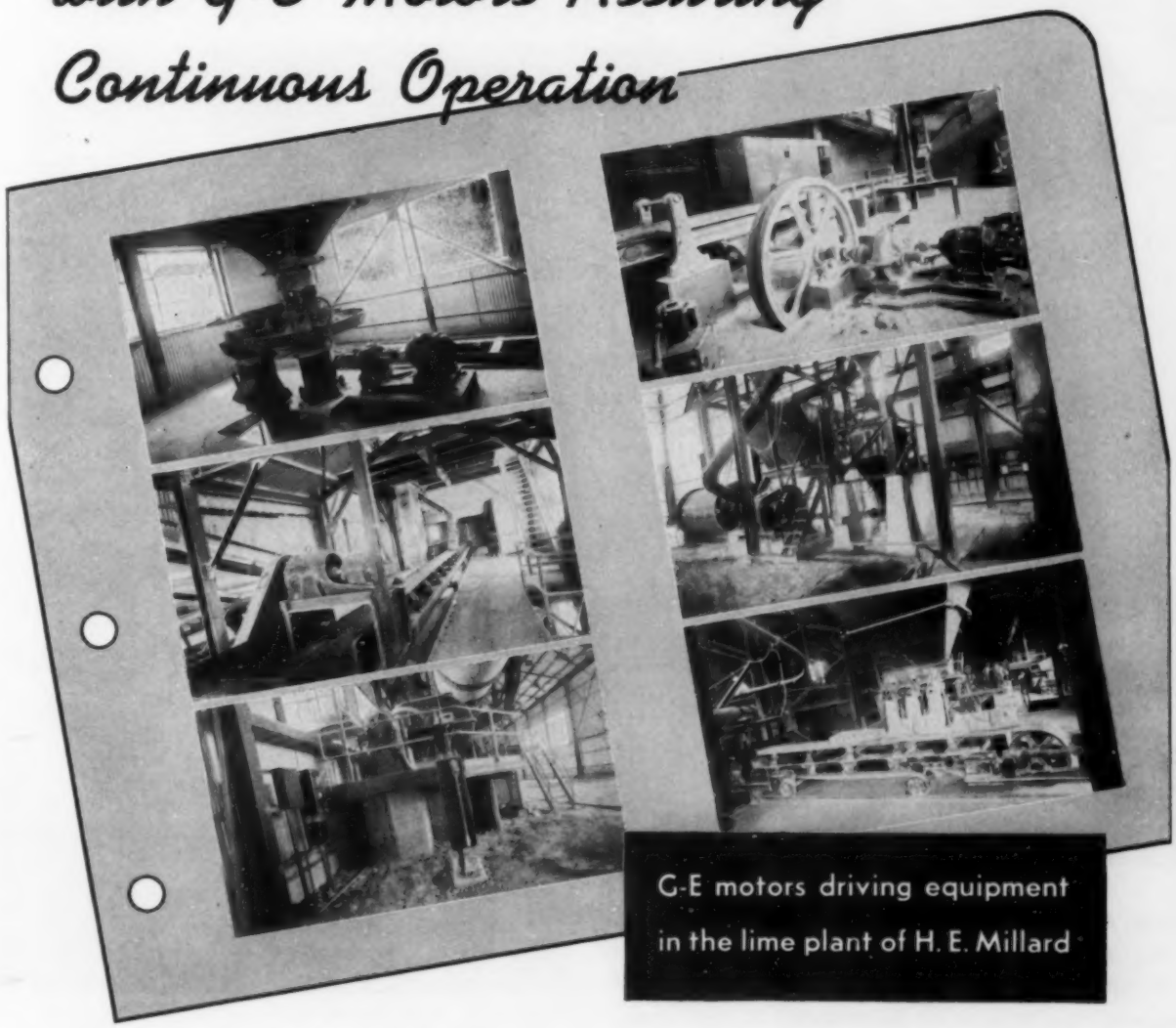
KENNEDY-VAN SAUN

MFG. & ENG. CORPORATION

2 PARK AVENUE NEW YORK, N. Y.

All Set for Low-cost Production

with G-E Motors Assuring Continuous Operation



G-E motors driving equipment in the lime plant of H. E. Millard

THE new lime plant of H. E. Millard at Annville, Pa., is all set for the low-cost production of high-quality lime. The plant machinery is of the most modern, efficient design, and the G-E motors that drive it help to assure continuous operation.

Most of these motors, operated by G-E matched control, are standard open types. Experience has shown that even where there is dust and vibration, the strong frames and end shields, the unusually protective insulation on the windings, and other features of construction enable G-E standard motors to give dependable, economical service on the toughest kinds of jobs.

You may be considering installing new equipment in your own rock-products plant—such as that illustrated here or of a kind to fit your particular requirements. For complete information about the electric equipment to operate it, call the nearest G-E representative. General Electric, Schenectady, N. Y.

011-255

GENERAL ELECTRIC

Another M. A. LONG CONSTRUCTION Triumph

● Left—New lime plant of H. E. Millard, Annville, Pa. Hydrating and packing plant at left end; lime storage silos in center with kiln building adjacent to stone crushing plant on right.

Below — Another view showing the new crushing plant, stone storage silos and kiln building.

The M. A. Long Company is proud of the part it played in the design and construction of the new plant of H. E. Millard at Annville, Pa. The Long organization designed and supervised construction of the stone storage silos, the coal storage silos, the lime storage silos and the kiln stack. As usual, the Long end of the job was completed on scheduled time.

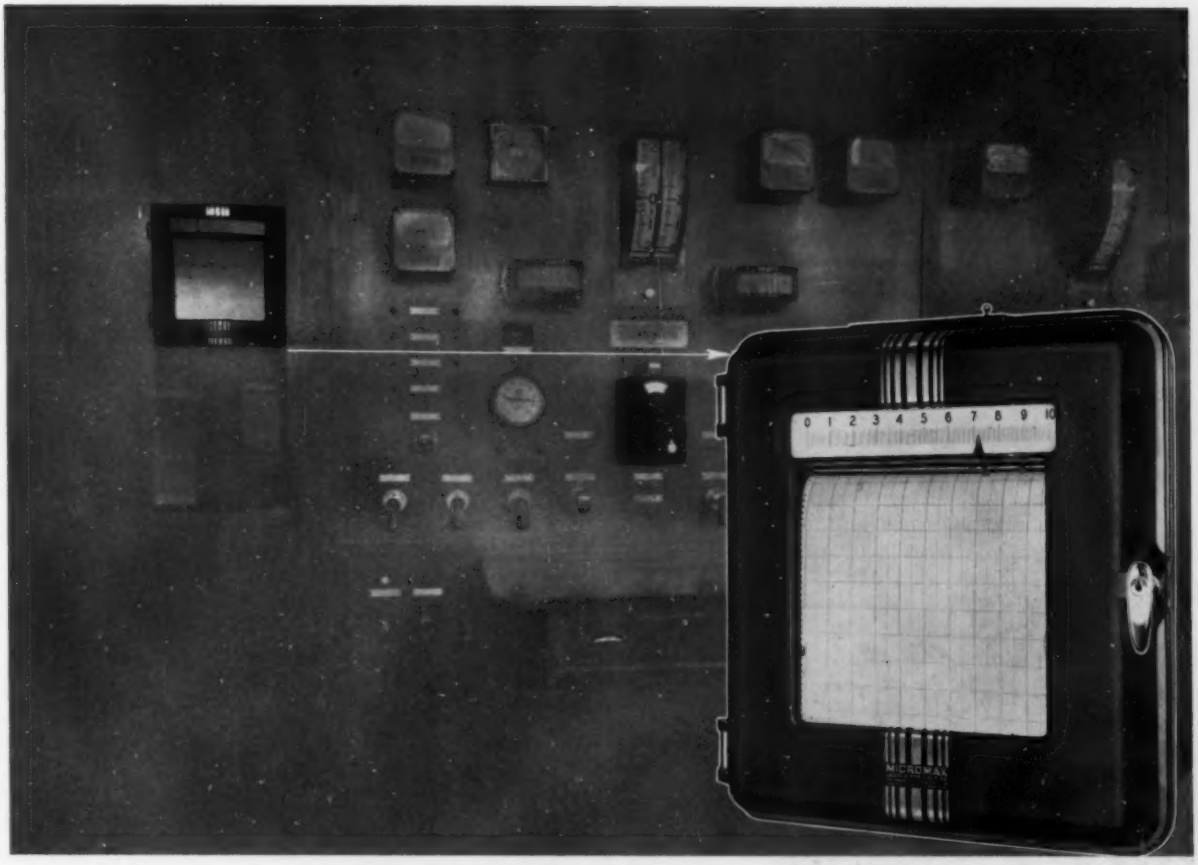
Write us for full information regarding Long Building Service, including the design and construction of lime and cement plants, grain elevators, industrial buildings of every description, schools, churches, apartment houses, reservoirs, etc.

The M. A. LONG Co.

Engineers and Constructors

10 W. CHASE ST., BALTIMORE, MARYLAND

ALLENTOWN CHICAGO



Reliability was the quality that led to the use of a Micromax Temperature Recorder and L & N Indicator for the rotary kiln control panel in the Millard plant.

FOR *Dependable* TEMPERATURE FACTS RELY ON MICROMAX PYROMETERS

Much of the lime kiln's use of Micromax Pyrometers is due to the industry's liking for solid, substantial machinery. For Micromax is a machine rather than an instrument; its parts are substantial castings, forgings, stampings and shafts having large safety factors. Bearings are ample. Assembly is careful; tolerances are close and alignments permanent; accuracy and responsiveness are practically unaffected by wear. The operation of this machine is in keeping with the powerful, sure style of the heavy duty machinery of the rock industry. It is available in models that supply temperature indication, record, signals or control in exactly the combination needed for a given application.

J—N33(11)

LEEDS & NORTHRUP COMPANY, 4975 STENTON AVE., PHILA., PA.

LEEDS & NORTHRUP

MEASURING INSTRUMENTS · TELEMETERS · AUTOMATIC CONTROLS · HEAT-TREATING FURNACES

This new lime plant uses only the finest equipment

At left—lime being reclaimed from storage over Thermoid belting.

Above—lime screening operation with Thermoid belting in the foreground.

At right—where Thermoid belting conveys lime to hydrate and pulverized lime storage bins in background.

Starting right "from the ground up" to build the newest type of rotary kiln lime plant, at Annville, Pa., the H. E. Millard engineers determined that only the finest materials, machinery and equipment would be installed. Experience had shown them that maintenance economies are best achieved by careful selection and use of the best materials on the market.

In the accompanying pictures, several of the important plant operations are shown in which Thermoid Conveyor Belting is used. From long experience H. E. Millard has come to rely on the superiority of Thermoid Products and the intelligent service of Thermoid's Harrisburg distributor, Appleby Bros. & Whittaker Co.

Thermoid congratulates the H. E. Millard organization on the high efficiency they have demonstrated. Thermoid takes pride as well in the part its products are playing to achieve this end.

Thermoid

THERMOID RUBBER
Division of Thermoid Company
TRENTON, NEW JERSEY

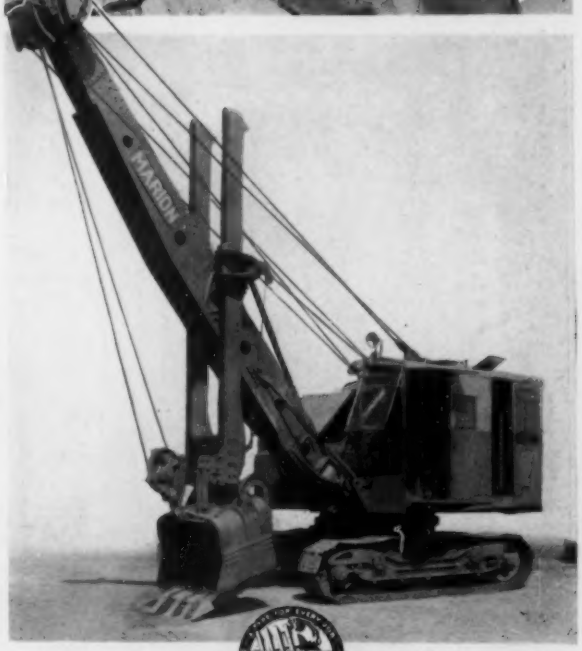
BELTING · HOSE · PACKINGS · BRAKE LININGS

5 MARIONS DO THE LOADING IN H. E. MILLARD'S 5,000 ACRE QUARRY

Because of the vast extent of these quarries, the loading shovels had to possess extreme mobility, sturdy construction, give speedy performance, and operate easily. That's why H. E. Millard selected MARIONS.

MARION is proud of the part it is playing in Mr. Millard's 5,000 acre quarry and in countless other rock products plants throughout the world.

Write for bulletins describing the machines in which you are particularly interested.

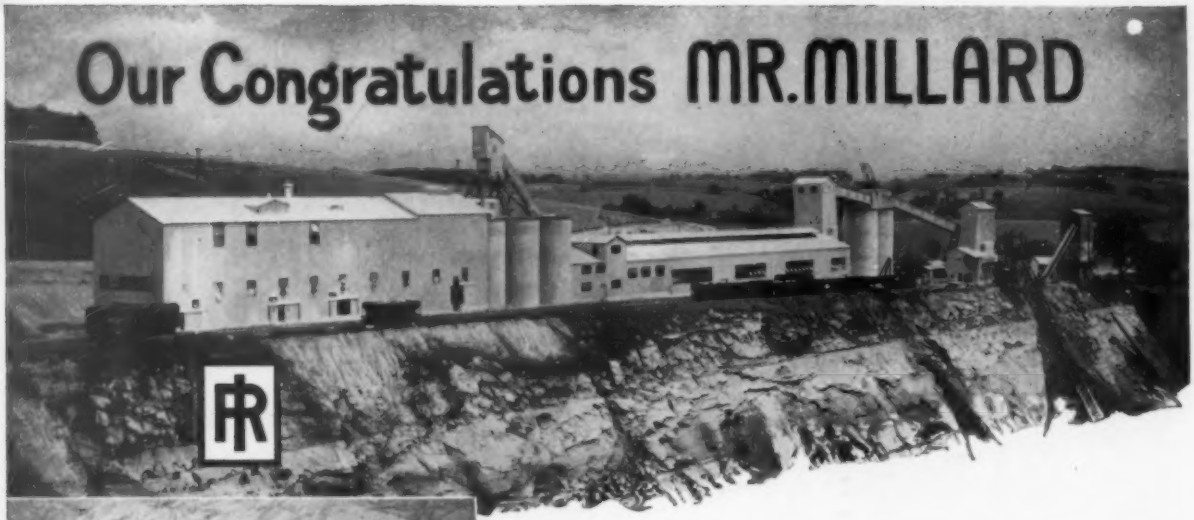


MARION

STEAM SHOVEL COMPANY

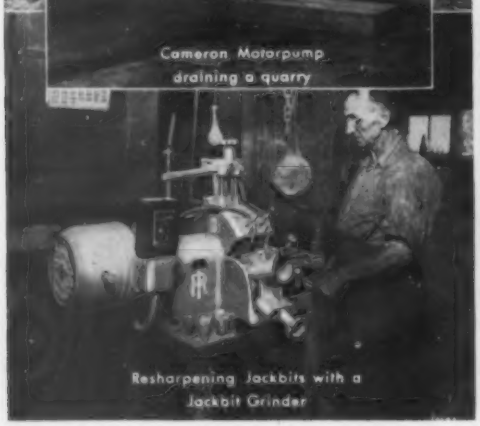
MARION, OHIO, U. S. A.

Our Congratulations MR. MILLARD



Working a heading with an I-R S-70 Drifter

Cameron Motorpump draining a quarry



Resharpening Jackbits with a Jackbit Grinder

Ingersoll-Rand congratulates H. E. Millard on the success of his new rotary lime kiln at Annville, Pa.

The business was founded in 1880 as a general quarry. Gradual development of the natural lime deposits since 1920, has made Mr. Millard one of the outstanding manufacturers of all kinds of lime and limestone products.

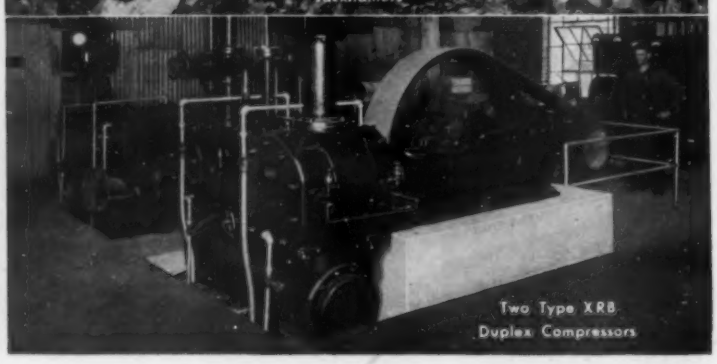
Mr. Millard has, from the very beginning made use of practically almost the entire Ingersoll-Rand line of quarrying machinery. Large duplex compressors furnish air for operating rock drills and other pneumatic equipment. Much drilling is done with Jackhamers and Drifters. The use of Jackbits has speeded up work, as they drill faster and further than drill steel and are easily resharpened two or three times on the Jackbit Grinder. Cameron Motorpumps and Coupled Pumps are used for draining the quarries and for general water supply.

Ingersoll-Rand is grateful to Mr. Millard for his general acceptance of its products, and extends best wishes for his continued success.

Ingersoll-Rand

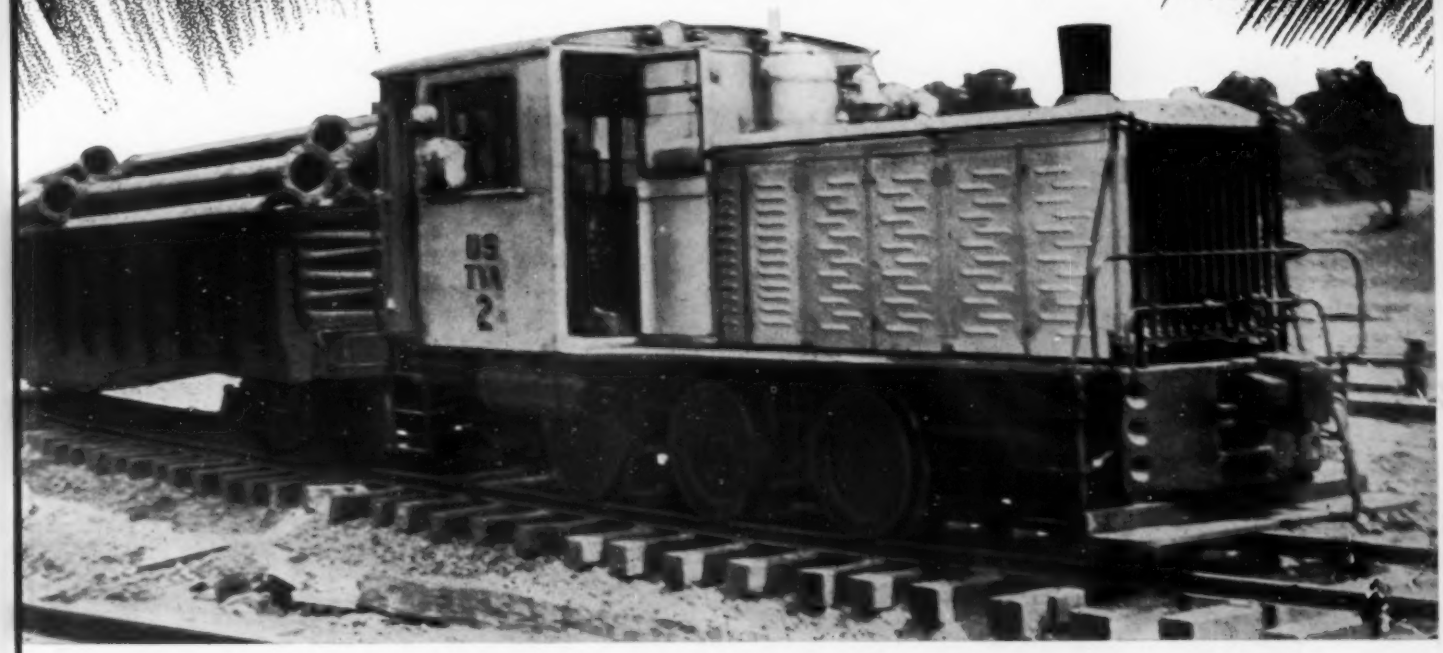
11 BROADWAY, NEW YORK CITY 534-14

Secondary drilling with Jackhamers



Two Type XRB Duplex Compressors

TVA goes PLYMOUTH



Plymouth 30-ton, Model WLD, 56½" gauge, Diesel Locomotive used at Guntersville Dam to haul materials and supplies on the standard gauge railroad. It is also used in switching.

You won't have to look long or hard to find a Plymouth Locomotive at TVA. TVA Plymouths were purchased because of their rugged dependability, low operating cost and unusual service under any and all conditions. Your service requirements may be similar to those at TVA — or they may be totally different. It doesn't matter for in either case Plymouth will make good—and make good at a profit.

Illustrated, TVA No. 2, 30-ton Model WLD, 56½" gauge, Plymouth Diesel in use at Guntersville Dam. TVA No. 1, No. 2's twin, is in use at Chickamauga. Both Locomotives are powered by 230 h. p. Diesel Engines. Both employ the famous Plymouth direct drive. Operating also on the exacting Cement run at Norris Dam, are four special gas-electric Plymouths. Complete descriptive catalogs upon request.

PLYMOUTH
LOCOMOTIVES
GASOLINE • DIESEL • BUTANE • PROPANE

-----MAIL THIS COUPON-----

PLYMOUTH LOCOMOTIVE WORKS
Division The Fate-Root-Heath Co.
Plymouth, Ohio

Send me descriptive catalogs covering Plymouth Locomotives
☐ Gasoline ☐ Diesel ☐ Propane-butane

Name .....
Company .....
Address .....
City ..... State .....

Maintaining the Pace

1937

celebrates the 25th Anniversary of the incorporation of the Atlas Powder Company. Some of its divisions date back much further than that,—The Giant Division, for example, dates back to 1868 as the first to manufacture dynamite in America.

RARELY is progress in improving products sensational. Only occasionally does a new product flash into the industrial firmament to become a fixed star. Developments which become standard practice evolve from steady painstaking improvements in products and production. Such developments maintain the pace.

Service needs in the field point the way to these developments. For 25 years, Atlas men in the field have been first to recognize the needs for better explosives and methods in the use of "controlled force." And for 25 years, every department of the Atlas Powder Company has concentrated on pioneering better methods—and better products.

25 years of experience—25 years of experiment—25 years of laboratory and field research have enabled Atlas to provide the right explosive for every type of blasting.

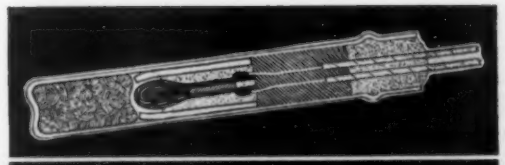
For 25 years, Atlas innovations have set the pace. The remark "You bought it first from Atlas" is appli-

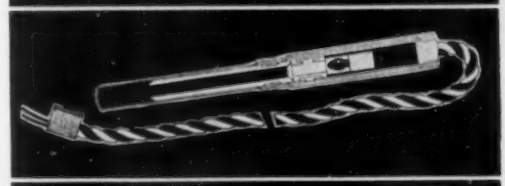
for 25 years

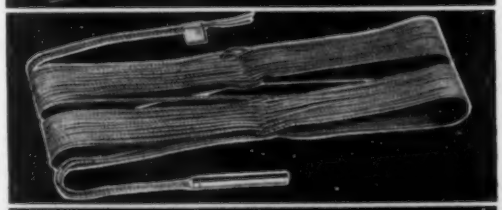
cable to a surprising total of blasting products—both explosives and accessories.

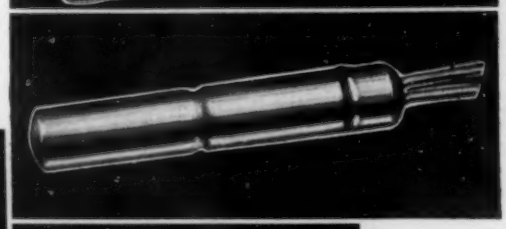
Today—Atlas explosives and Atlas Blasting Accessories are standards of modern practice in applying "controlled force" to the fields of production. Atlas provides the right explosive for every job,—and the right accessories for methods that bring the most effective results from blasting.

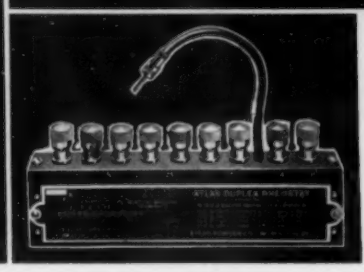
Illustrated on these pages are some of the Atlas products which help maintain the pace. Many of them are Atlas "Firsts." And with all Atlas products go the assistance of Atlas representatives,—qualified by years of cumulative experience in developing effectiveness and economy in blasting operations.











OTHER ATLAS PRODUCTS
INCLUDE

ZAPON INDUSTRIAL FINISHES	ZAPON COATED FABRICS	DARCO ACTIVATED CARBONS	ATLAS INDUSTRIAL CHEMICALS

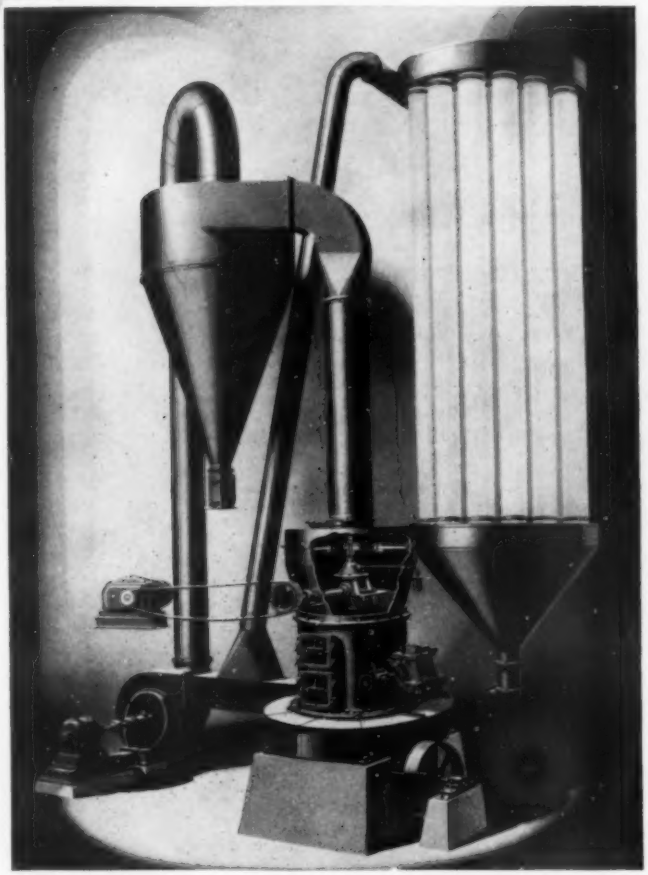
ATLAS

POWDER COMPANY

Wilmington, Delaware

CHEMICALS ATLAS EXPLOSIVES

What a difference a Whizzer makes!



The new Whizzer-type Roller Mill has proved such a success that many plant operators are adding this patented feature to their old machines.

If your Raymond Roller Mill has given you long and faithful service . . . and you cannot afford to replace it with a complete new unit . . . you can modernize it with a Whizzer Separator, and get results like these:—

CAPACITY DOUBLED—In the production of chalk whiting, the former capacity of 1500 to 2000 pounds per hour has been raised to 4000 pounds hourly by substituting a Whizzer Separator on the Raymond Roller Mill for making a finished product of 99.7% minus 325-mesh.

POWER COSTS REDUCED—Plant operating three roller mills had averaged 4¾ tons per hour grinding limestone. After two mills equipped with Whizzers, output raised to 6¼ tons, permitting shutdown of third mill. Power costs cut in half.

OUTPUT UP 35%—In pulverizing phosphate rock to 92% passing 200-mesh, production was increased to 4½ tons per hr. by using Whizzer Separator on roller mill, a 35% increase over former capacity.

IMPROVED PRODUCT—For grinding barytes, roller mill was equipped with Whizzer Separator. Fine grade of material produced, testing 99% through 300-mesh at 4 tons per hour, with higher output and lower cost.

Advantages of Whizzer-equipped Roller Mills are described in Bulletin No. 28.

RAYMOND **PULVERIZER DIVISION**
1307 North Branch Street, Chicago

COMBUSTION ENGINEERING COMPANY, INC.

Offices in Principal Cities . . . . . In Canada: Combustion Engineering Corp., Ltd., Montreal

PIONEER, A RECOGNIZED LEADER IN THE PORTABLE FIELD, NOW BECOMES A

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VI

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March 1, 1927

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WOVEN WIRE SCREENS FOR ALL PURPOSES

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A NEW Rugged Boom For Rock Digging

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1½ yd

Thew rings the bell again! This time it is the 1½-yd. Lorain-77 featuring a new and tested shovel boom designed especially for quarry service. Here is a "front end" construction which asks no quarter from any rock and gives none. Grueling hours, days and months on the rock pile won't faze it because Thew engineers have given this boom every defense against digging strains.

The combination of a separate torsional unit with structural side members results in a boom designed accurately for twisting as well as bending and compression stresses. This torsional unit, consisting of a huge seamless tube, and the structural side members function independently of each other to give exceptional strength at minimum weight. The boom's 18-ft. tubular steel dipper stick also offers the greatest torsional and bending resistance per lineal foot of weight.

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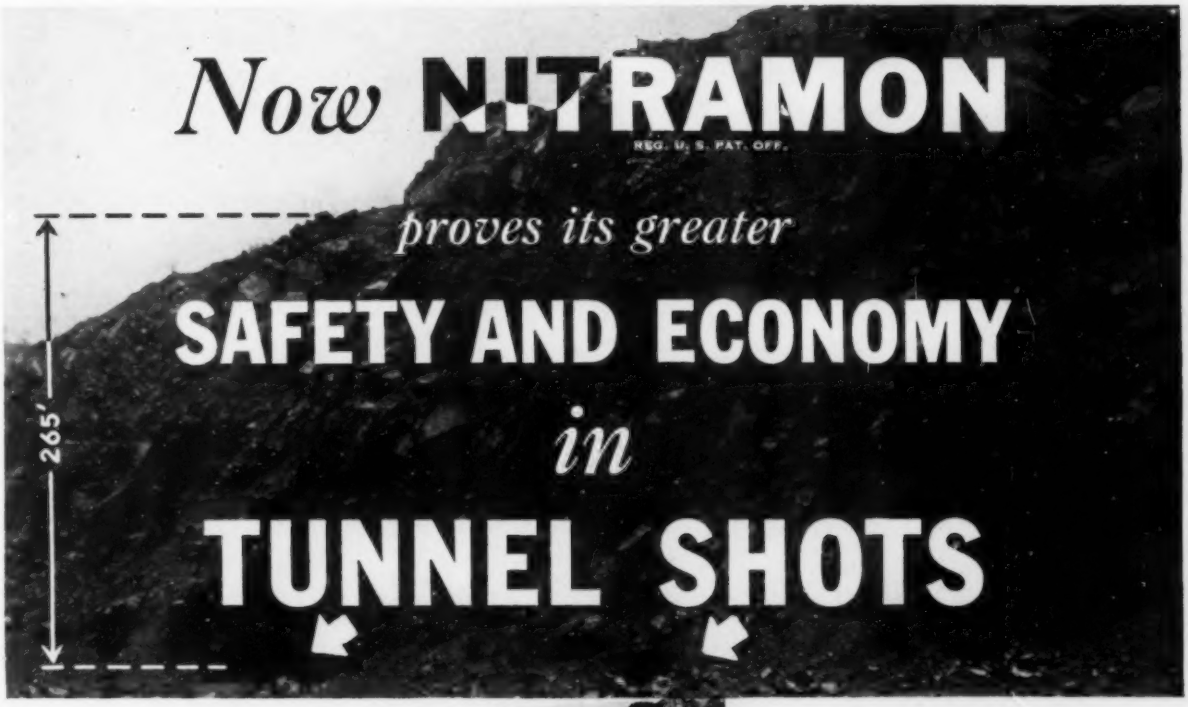
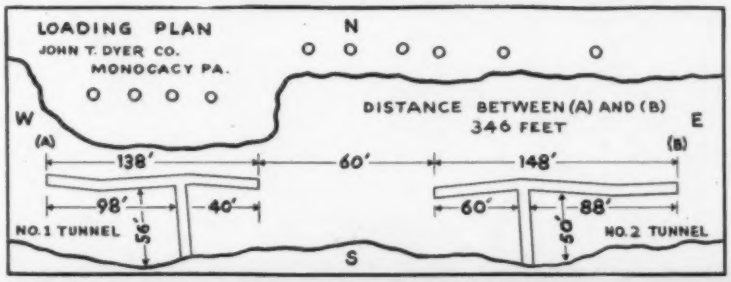


53,000 pounds of Nitramon were loaded in two tunnels and ten well drill holes in six hours at the John T. Dyer Quarry at Monocacy, Pa. Over 300,000 tons of stone were brought down with fine fragmentation. Very little, if any, secondary blasting will be necessary.

After the shot. Notice fragmented rock thrown well away from the face in good position to be taken up by the shovel.

Loading plan showing position of tunnel and well drill holes.



NITRAMON has already proved that it is safer and more economical in well drill shots. Now it has proved the same advantages in tunnel shots.

It is more economical because it loads quicker. Tunnels may be brightly lighted with electric lights instead of "flashlights." The air in the tunnels stays clear and pure because Nitramon contains no nitroglycerin. It produces no headaches.

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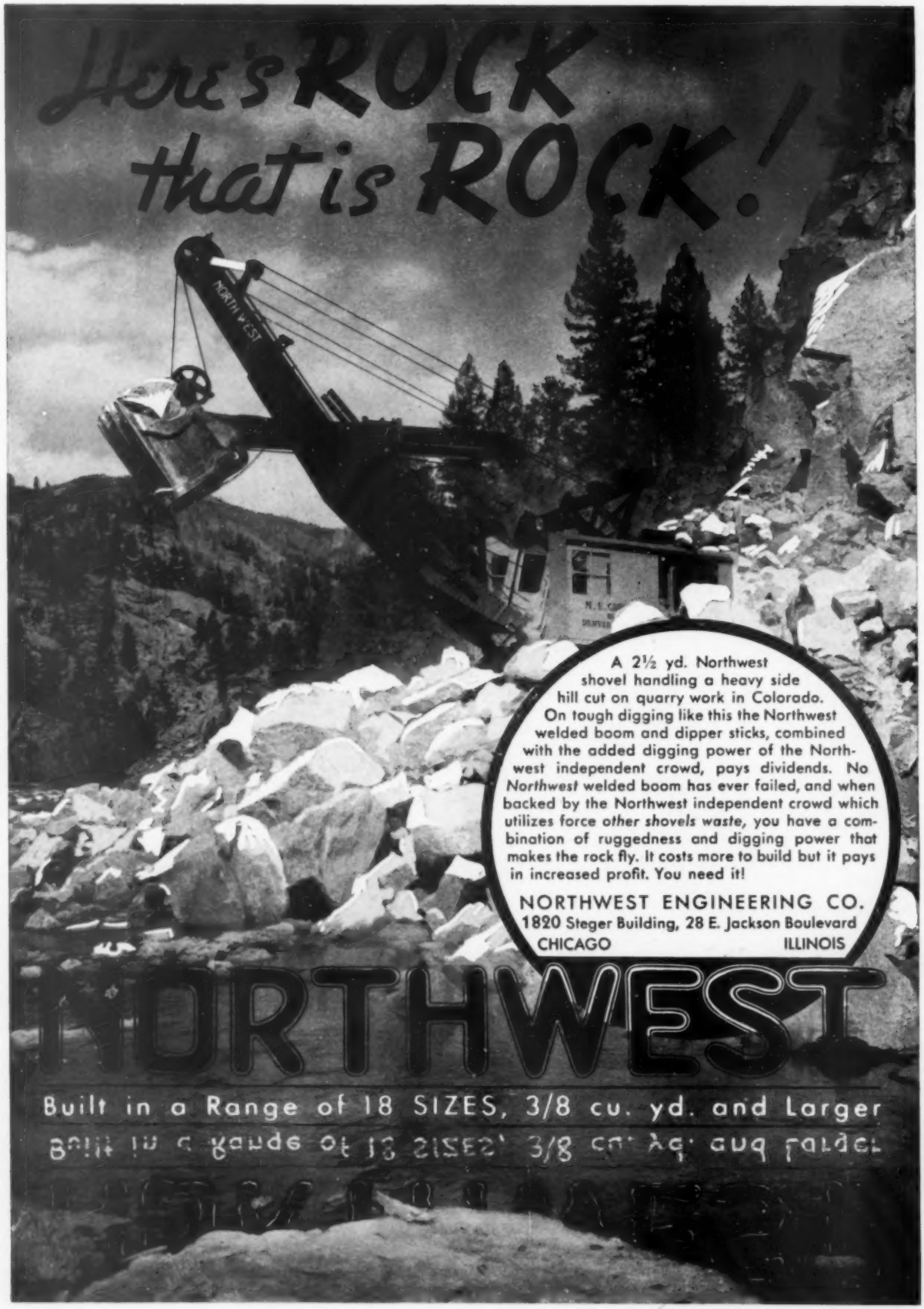
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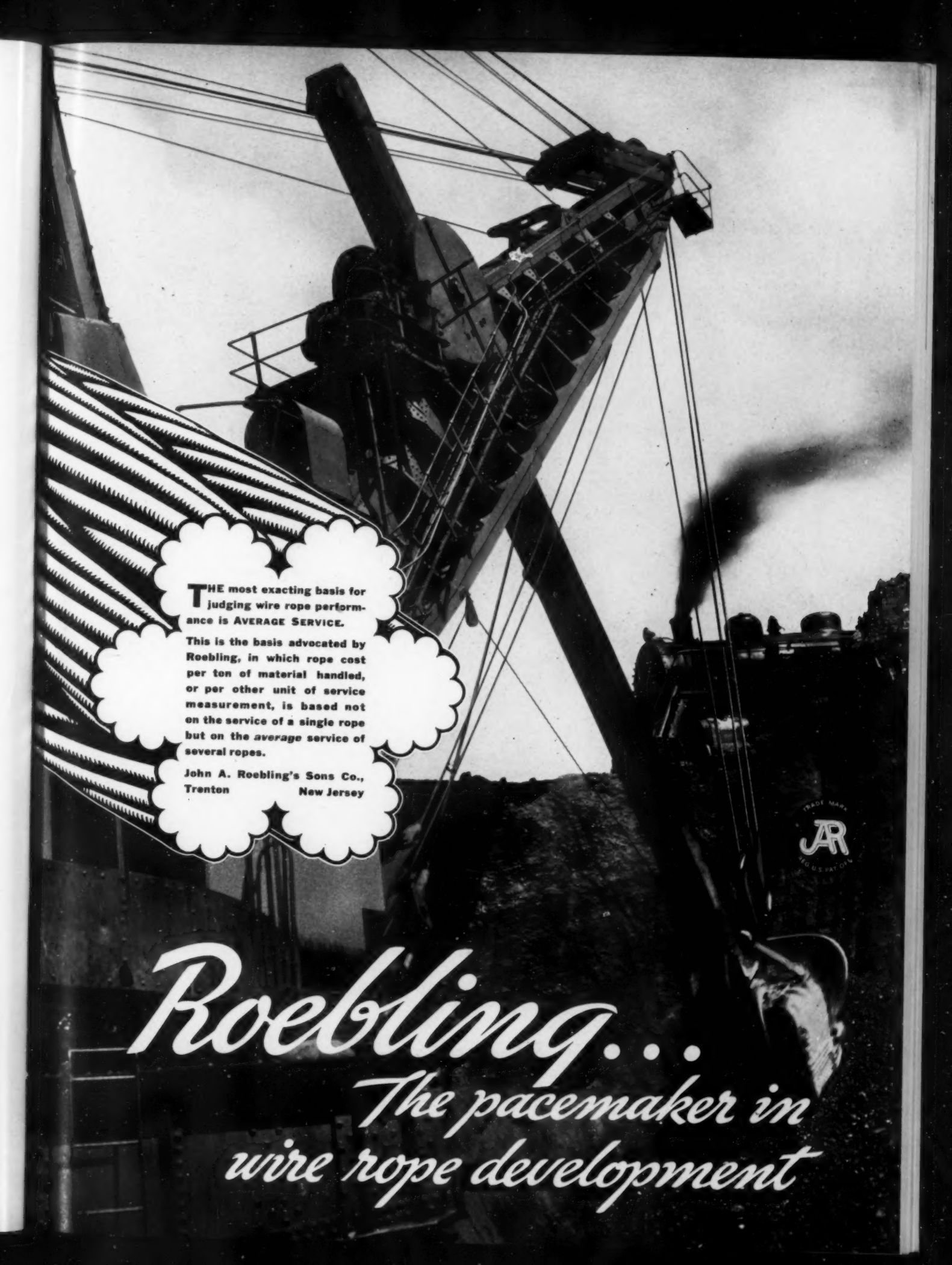
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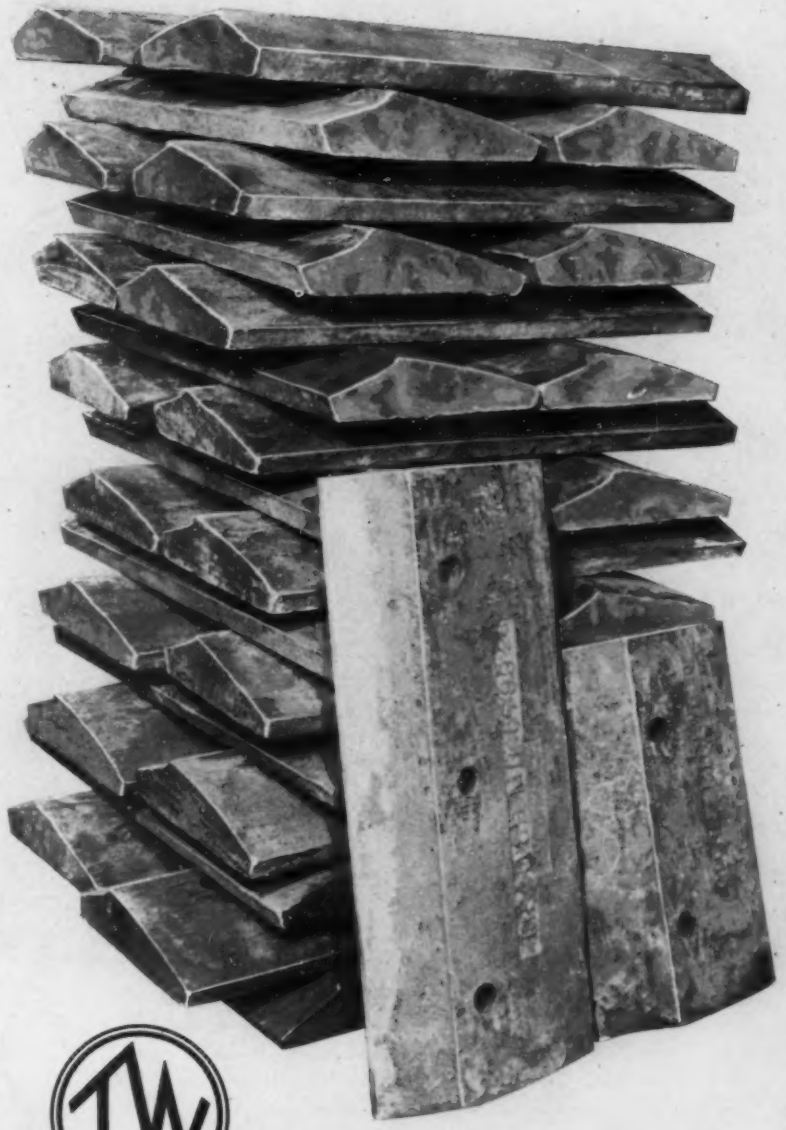

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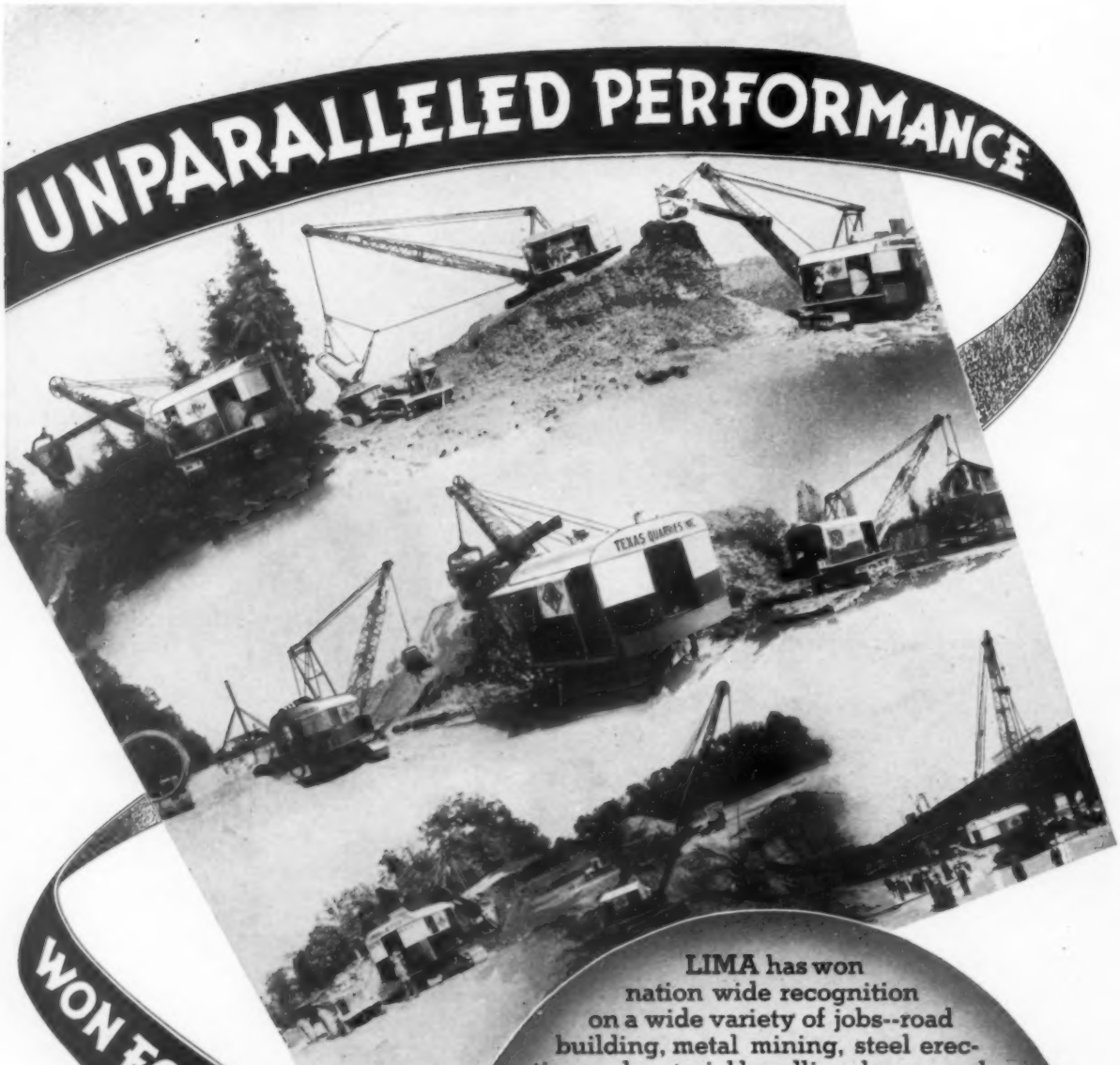

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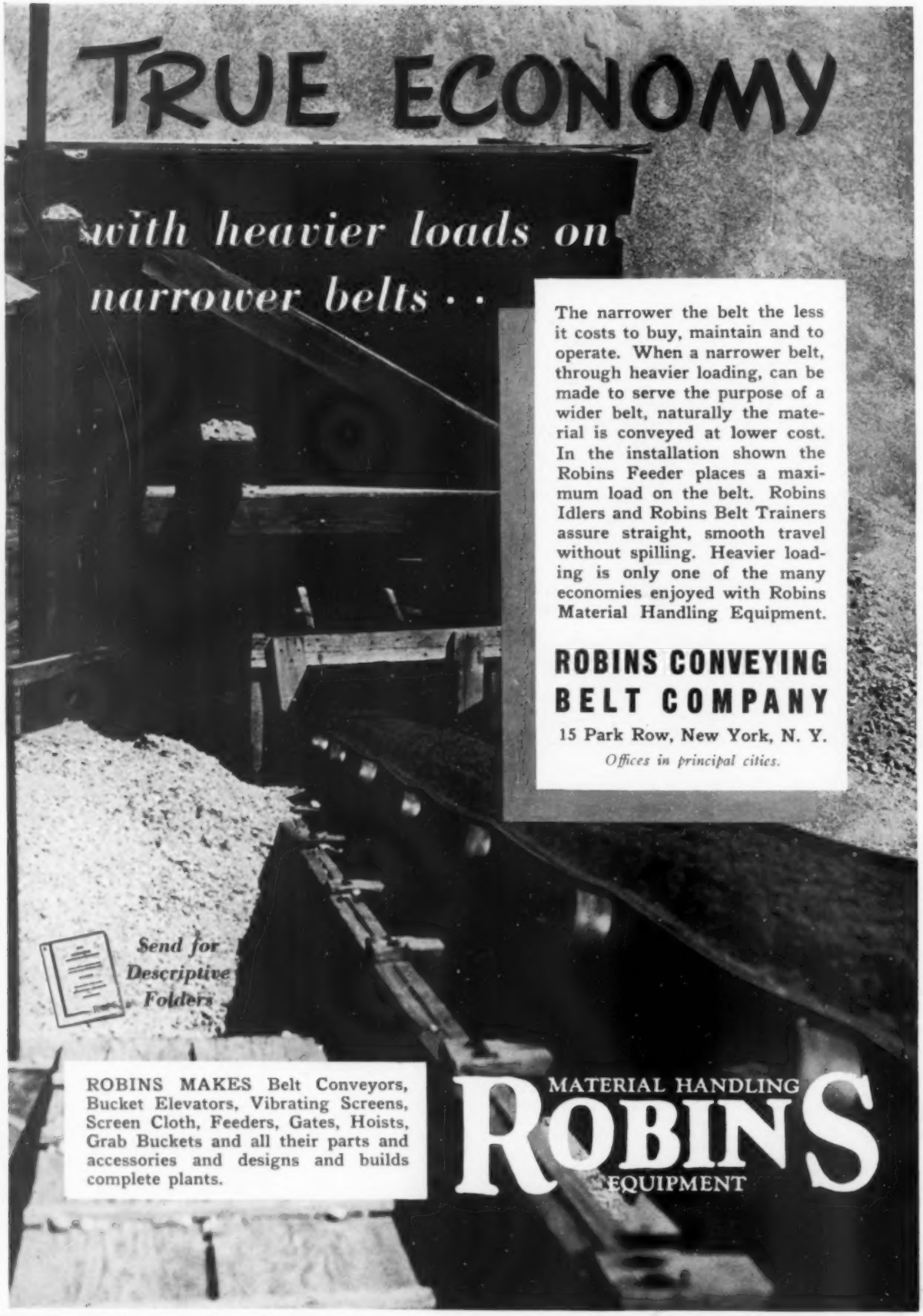
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Rock Products

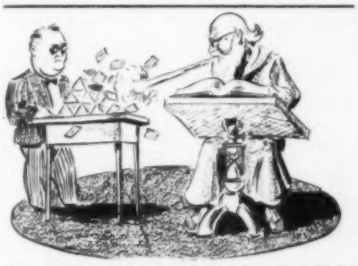
Vol. 40 Chicago, August, 1937 No. 8

Trends and Developments

Comments by the Editor

For a short time business men were inclined to believe, or at least wanted to believe, that there was a return to something like conservatism on the part of Congress in rejecting the President's Supreme Court packing scheme. Since then the Senate has passed the amended Black-Connery wage and hour bill, with every prospect that it will become law by the time this issue of Rock Products is published. A large part of labor, certainly the conservative part, as well as employers, were against this bill, Congress itself was believed to be against it, but the President wanted it, and that's enough, still.

No Cheering!



The attempt of the federal government to regulate hours of work and wage rates for the country as a whole, after experience with NRA, means that industry is in for a long period of controversy and misunderstanding in labor relations, at a time when recovery was setting in more strongly than ever. It is certain that many industries, and very possibly some labor unions, will not accept arbitrary rulings of an executive-appointed board without appeal to the courts.

Like a considerable part of the New Deal legislative program, there is much in the Black-Connery bill that appeals to all liberal, fair-minded people, employers as well as employes. These want to see all who work receive the highest *possible* wages for the *shortest* possible working day. They think that possibly we have laid too much stress on industry in our present civilization, and made the earning of a living occupy too much of one's life and energies, to get the most out of life. That is a noble, even if vague, objective, as any one must admit.

It should be obvious, however, that such an objective could be attained only if everyone would coöperate to use the time spent in production to the utmost advantage. For it is production that is needed to satisfy the wants of the ambitious workman, and not higher and higher wages and shorter and shorter hours, which merely dangle his wants before his eyes, but by constantly higher and higher prices are kept out of his reach. Consequently, it is equally obvious that present noble experiments will ultimately fail, because they are founded on acts not for the workman's benefit by promoting closer coöperation and understanding between employer and employe, but for driving them farther apart through forcing the organization of a national labor party for the benefit of labor officials and federal politicians.

We must not forget that the whole theory of the New Deal, as now exposed, is based on the formation of a farm-labor party. To succeed, the self-reliance of farmers and laborers must be broken down. They must be compelled to go to Washington with all their troubles. Their "customers"—the people who directly buy their produce and labor—must be continually presented to them as their worst enemies. Any coöperation to settle problems locally, that would promote employer-employe friendliness, would be fatal to the success of the whole scheme.

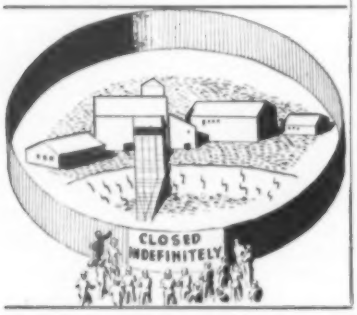
That policy pursued to its ultimate and inevitable goal could result only in the elimination of *all* individual initiative in business and industry. For as long as business is run as private enterprise, there will always be good business managers and bad business managers, successful ones and unsuccessful ones, those who are able and willing to pay the highest possible wages; those who are able and unwilling; those who are unable but willing, and those who are both unable and unwilling.

The proposed law could not possibly change *all* these conditions. It could help in only one case—the employer who is able but unwilling. The willing ones who were temporarily unable would become the prey of rich and powerful competitors, however much they might be loved, respected and needed by their employes and their community.

So, if every farmer and laborer is to be treated alike and to be "assured a fair deal," the government will eventually have to take over the actual management of industry. And then will all be happy in the knowledge that every one else has been reduced to one's own level? Not in the least; because they will find that many are still better off than they. Those will be the politicians and the favorites of the politicians. There will be just as many stages of being well off and being poverty-stricken as ever, but the reasons therefor will change from the degree of skill and ability in one's work, as at present, to the degree of servility and bootlicking to which one stoops in politics. Not some but *all* business then would be so rottenly managed that instead of abundance there would soon be scarcity for all except the politicians.

That brings up a national problem that is even more serious than labor relations. For we may still meet the challenge of the politicians in labor relations by cultivating our own employes. The greater problem is *taxes*. Today it is said that one-third of our national income goes to pay the taxes of nation, state, county, city or town, and the tendency is constantly to increase this tax burden. We are getting redistribution of our national income all right, but it is not being redistributed to producers, but to politicians and non-producers generally. The higher-paid workers are only slightly better off because prices have risen and are rising not only on account of higher wages, which are justifiable, but on account of hidden costs in taxes for every conceivable item, many of which are wholly unjustifiable.

Don't Copy!



For what is this tax money largely spent? Primarily to put a premium on shiftlessness and irresponsibility. No one begrudges pensions to the genuinely needy; every one today knows that very little reaches the genuinely needy, but an entrenched "clientele" of the New Deal manipulators.

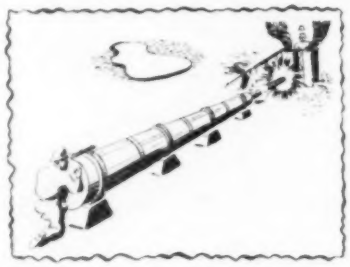
Elsewhere in this issue is a news item of the permanent closing of a southern quarry and crushing plant. The president and principal owner of the company we know to be a very fine type of citizen and gentleman. His plant was closed by a strike several weeks ago. Recently, according to local newspapers, he announced that the plant would be fenced off and permanently closed. He is reported to have said to former employes, the state and federal labor conciliators: "We have lost money for years, and have wanted to close the plant. This we would have done long ago except for the resultant hardship on employes. Now our decision has been made for us."

How many producers are beginning to feel the same way? We know that many such plants have been operated the last few years far more for the benefit of employes than for the owners. However, we could hardly suggest wholesale closing of plants as a solution of the problem. There should be ways of taking employes into the confidence of management so that such extreme measures are not necessary. Great as the justification for such individual action may be, if generally adopted it would hasten the day when individual initiative in industry would be eliminated. There would be an irresistible demand for the expropriation of such plants, and we should soon have conditions comparable to those now existing in some parts of Mexico.

This is no time to take a fatalistic attitude toward discouraging developments. The American workman is just as self-reliant and individualistic, fundamentally, as is his employer. Every effort should be made to promote these traits, notwithstanding the pressure of the federal government in the opposite direction. The field for action is not in Washington combatting crazy ideas, but in your own plant and neighborhood, where you deal with sane people.

We are giving a lot of space in this issue to a description of a new lime plant. It has a rotary kiln that in its design has had applied the results of much recently acquired knowledge and experience gained in the operation of rotary kilns in the portland cement industry. The principal feature is a very long kiln, equipped with all the latest devices and instruments to insure the utmost fuel economy.

Direct Hit?



It is really too early to tell whether operating economies will be all that are expected. It is claimed that these long kilns will give fuel ratios comparable to the best operated shaft kilns. It is also claimed that because of the longer time element it will be possible to make lime at lower temperatures. This is highly desirable in the case of lime for some purposes. Also with lower temperatures it will be possible to use pulverized coal to better advantage because the temperatures will not be great enough to fuse the ash with the lime, which is objectionable.

In any event the recent tendency in lime manufacture is all in the direction of rotary kilns. During the last two or three years about 1,500,000 tons of annual capacity has been added to the commercial lime industry—all in rotary kiln plants. With an annual consumption of lime of around 3,000,000 tons, that is a 50% increase in capacity. At least as much more capacity has been added by paper and chemical companies, also in the form of rotary kiln plants.

Rotary-kiln lime appears to be preferred because it is possible to control the burning operation and thus give the customer the kind of lime he wants. For lime putty and building lime generally a soft-burned lime is most desirable. Hard-burned particles that hydrate slowly are apt to cause unsoundness in the resulting mortar. For some chemical purposes, indeed probably for most chemical purposes, a quick-settling lime is most desirable. This may mean a hard-burned lime.

With a rotary kiln, one can make either a hard-burned lime or a soft-burned one—but obviously not at the same time. To get uniformity of product it is necessary not only to control temperatures, but the size of the feed. One can burn 2½-in. down sizes of stone in a rotary kiln. But for uniformity of product the feed for any one period should be uniformly sized.

There remains much to be learned about the economy of long rotary lime kilns. Today no one has very much data on dust loss, which must be very considerable. Also, there is too much temptation to compare rotary-kiln product and operation with inefficient shaft kiln operation. Great strides have been made and are being made in shaft kiln design and operation.

Even crude shaft kilns can be operated to produce the *very particular* kinds of lime, as Miss Mary E. Squire proved long ago at her Allwood Lime Co. plant, Manitowoc, Wis. The chief result of the wider use of rotary kilns for lime is apt to be a better understanding of the fact that *there are different* kinds of lime.

E. D. Williams, left, and H. E. Millard

Exact Methods for Product Quality—Flexibility of Operation—and Centralized Control of Machinery Units Are Features of

H. E. MILLARD'S LIME PLANT

Described and Photographed by BROR NORDBERG

H. E. MILLARD is one of the largest land owners in Pennsylvania, a limestone producer and lime manufacturer all his life, a flour miller, farmer and breeder of blooded stock.* In all these lines he is progressive and a leader. So it was to be expected that with the current trend toward lime manufacture in rotary kilns, he should build a rotary kiln lime plant that probably is the most advanced in the world.

To accomplish this he has drawn on his own vast fund of experience and has employed some of the leading rotary kiln designers and engineers available. The resulting plant has numerous novel features (for a lime plant), which provide as near complete control of manufacture and of quality of product as are obtainable at this time. Mr. Millard has profited much from the latest developments in portland cement plant design, through F. L. Smidth & Co., builders of portland cement plants the world over. This plant, however, marks the entry of this firm into the lime plant field in the United States, although it has designed and operated lime plants abroad. The plant was placed in operation in May, 1937.

Quarries

The quarry operations were described in detail in ROCK PRODUCTS, July 5, 1930. Since then, however, certain changes and refinements have been introduced to tie the crushing and screening plants to the new lime plant.

The five quarries are connected with each other by a system of tunnels, so that stone from any one of them may readily be handled to a washing plant or to a new secondary crushing plant, from which the kiln feed bins are filled.

The quarry property, representing some 5000 acres, is divided into 24 farms. The quarry openings being subject to filling with water from seepage, at times to a depth of 100 ft., an elaborate and efficient pumping system was installed years ago to handle an average of 25,000 g.p.m. For this drainage, it was necessary to line a stream with concrete to reduce the water inflow. The five quarries are numbered from one to five beginning with the east quarry, all draining to a common sump in quarry No. 3. The pumping plant was described in ROCK PRODUCTS, July 5, 1930.

A large pumping job had to be done preparatory to placing the new lime plant into operation. In 1934, when business conditions were at a low ebb, a severe storm struck this part of the country and when the entire pumping plant was taxed to full capacity, it was decided to abandon the maintenance of operations in these quarries. For three years, water to a depth of 110 ft. stood in the quarries. In the interim, quarry No. 5 was worked in two benches above the water level.

After 3½ months' pumping at the rate of 15,000 g.p.m., the other quarries were pumped out and operations were resumed in the primary crushing plant in anticipation of meeting the increased demand for commercial crushed stone and for rotary kiln feed.

Selecting Stone Quarried

Quarrying is done by a system of control, regulated by laboratory analyses, to separate out and deliver the stone highest in calcium carbonate to the new secondary crushing and screening plant, to be sized for transference to the lime kiln feed bins.

The two secondary crushing plants are each independent of the other, but are so connected that stone can readily

* For a description of his many quarry products and activities see ROCK PRODUCTS, July 5, 1930.

Quarries totaling a mile in length are under operation at Annville. The new lime plant is in the background

be transferred from one to the other. A high grade dolomitic stone is generally passed through the older secondary plant for commercial stone. The stone in quarry No. 5, the only one operated from 1934 to 1937, is particularly adapted for making lime. Stone from the top strata is hand-loaded. Kiln stone from the other quarries is loaded by power shovels. Stone loaded in quarry No. 5 is discharged from standard 60-ton bottom-dump railroad cars, or trucks, direct to the new secondary crushing plant.

However, since the other four quarries have been pumped out, most of the commercial and fluxing stone, is handled by power shovels and industrial cars, and selected stone may be handled through the primary crushing plant for burning in the new lime plant, after sizing in the new secondary crushing plant.

Loading is done by two Marion 37 electric 1½-yd. shovels, one Marion electric 1-yd. shovel, two Marion steam 1-yd. shovels, two Bucyrus-Erie electric 1-yd. shovels and one Bucyrus-Erie electric 1¼-yd. shovel. Stripping, loading from stockpiles and general utility work around the plant is done by a Lorain 40 1-yd. gasoline shovel. Western 5-ton dump cars from quarry No. 4 are hauled by either an 8-ton Plymouth locomotive or a 5-ton Whitcomb locomotive to the primary crushing plant on the floor of quarry No. 4. At times stone may be hoisted to 60-ton standard railroad cars, and then it is delivered direct to the crushers in either of the two secondary plants, over rails adjacent to the quarries and parallel to their center line. When so hauled, the cars, after discharging to the crusher, generally proceed to the finished stone bins and are loaded for shipment, with the cars traveling in one direction out of the plant.

When rock is hauled to the primary crushing plant by Western dump cars, it is discharged directly into a Kennedy No. 10 gearless gyratory crusher. Capacity of the primary crushing plant is 500 tons of crushed stone per hour.

The crusher discharge is carried to stockpile over a Stephens-Adamson belt conveyor, 95 ft. centers, from which it is reclaimed through a tunnel under the storage pile by a pan conveyor and elevated to a Kennedy 4x10-ft. single-deck scalping screen on the bank above. This is done by a 5-ton Kennedy hoist.

Oversize stone from this screen is chuted either to a Kennedy No. 8 gearless gyratory crusher, or direct to cars as fluxstone. As a third possibility, the oversize may be bypassed to the Kennedy No. 25 gyratory crusher in the new secondary crushing plant, where sizing

All quarries drain to a common sump, from which water is pumped night and day into a nearby creek

Stone from the new crushing plant on left is stored in the concrete silos. The skip hoist reclaims stone from belt conveyors below the silos for the burning of lime, or elevates stone to the silos when brought in by truck. The kiln building and exhaust stack are on the right

is done for either commercial or kiln stone. And finally, the screen rejects may bypass all crushers to the washing plant.

The throughs from the No. 8 crusher, or stone bypassing it, may be further reduced through a Kennedy No. 25 gearless gyratory crusher and carried to the washing plant over a 24-in. belt conveyor, 124-ft. centers. Five sizes of washed stone are produced.

New Crushing Plant

As a general practice, all high calcium stone to be burned is processed through the new secondary crushing and screening plant, which was designed to furnish a high quality stone to the kiln feed bins, but the plant has additional capacity for commercial stone—200 tons of stone per hour altogether.

As a rule, dolomitic stone is passed through the second and older secondary crushing plant of 125-ton hourly capacity, which is equipped to dry screen or to wash stone. In cases of emergency, stone is readily transferable from the older to the new secondary plant, and if need be the procedure can be reversed. Some of the stone passing through the new plant is that hand-picked from quarry No. 5.

From quarry No. 5, 60-ton bottom-dump cars discharge through a track hopper to a No. 22 Kennedy gearless gyratory crusher, over a Kennedy feeder. This crusher, on occasion, may be fed or bypassed by stone coming from the second and older secondary crushing plant, either from the crusher in that plant or from the Kennedy scalping screen. The transfer is done over a Stephens-Adamson 20-in. belt conveyor, 44-ft. centers, in a tunnel. This conveyor is reversible.

Belt widths of 20 in. and belt travels of 250 f.p.m. have been standardized wherever possible throughout the new crushing and lime plants.

The crusher is set so that 50% of its discharge will pass a 2½-in. mesh screen and be retained on a 1¼-in. (kiln stone), the remainder dividing fairly equally between six other gradings. Crusher throughs are conveyed by a Link-Belt bucket elevator, 99-ft. centers, direct to the screens. Two Kennedy 4x10-ft. triple-deck vibrating screens, one mounted directly over the other, and operating as a single 6-deck screen, separate the stone into seven sizes.

Screen openings from the top to the bottom decks are 3-in., 2-in., 1⅛-in., ½-in., ¼-in. and 8-mesh, square, made of wire $\frac{5}{16}$, $\frac{7}{16}$, $\frac{5}{16}$, $\frac{3}{16}$, $\frac{3}{32}$ and 0.098-in. diameters, respectively. The problem of changing screen cloth has been simplified by mounting the discharge box from the screen (22-deg. slope) and the bin chutes on rails, making them readily movable. In 20 minutes a screen cloth change is completed.

The screen oversize (plus 3-in.) and the other six stone sizes are chuted directly to bins. Six bins have 75-ton capacity each, while the seventh is partitioned for the storage of the smaller sizes.

Stone may be reclaimed from any bin for shipment. The bins on the north side of the plant load by gate chutes into trucks, while either trucks or cars are loaded from bins on the south side. Provision has been made to increase the production of finer stone sizings if and when the demand requires. Stone from either bin may be reclaimed on a 20-in. belt conveyor 47-ft. centers, and sent to a Kennedy No. 25 gearless gyratory reduction crusher. This crusher's throughs are returned to the sizing screens by the 99-ft. Link-Belt elevator.

Stone of any size is made available for the kiln feed bin, not from storage bins, but directly as it comes from the screen box discharge and chute system, which transfers stone to a Link-Belt 20-in. belt conveyor, 129-ft. centers, feeding the reserve storage bins for kiln stone.

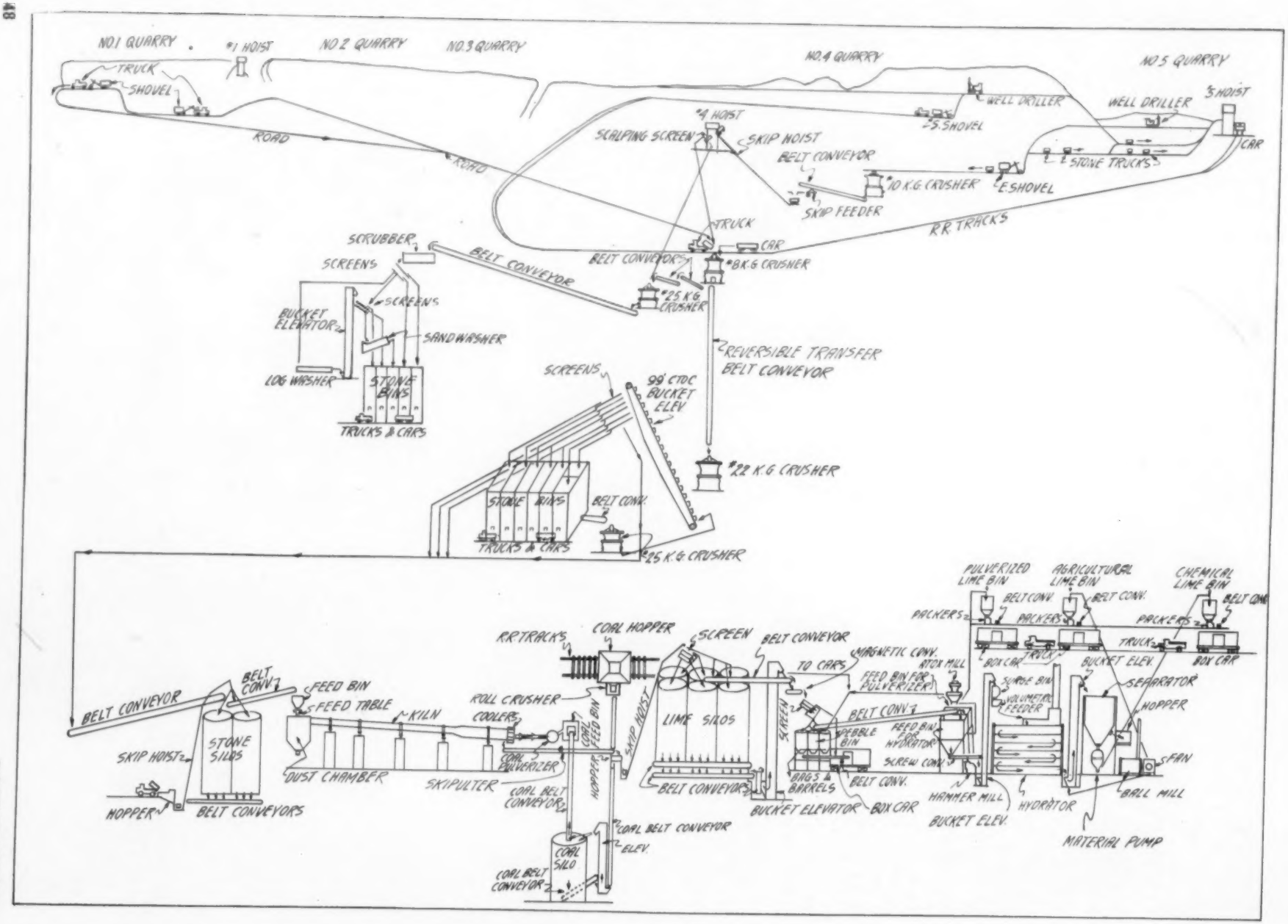
The practice in handling stone or lime in the new plants, is to handle the flow of materials between any two points directly, whenever possible, rather than to reclaim from storage, with much unnecessary re-handling.

The conveyor may discharge to either one of two places. It may discharge direct to either one of two reinforced concrete silos of 2000-ton capacity each, or the stone may be transferred to another belt conveyor going direct to the kiln feed bin. This second is a 20-in. Link-Belt conveyor, 106-ft. centers.

Kiln Feed

The kiln average output is approximately 125 tons of burned lime in 24 hr., which requires about 225 tons of stone per day. The kiln feed bin is steel, with a capacity of 300 tons. When this feed bin has been filled by conveyors from the screen house, the excess kiln stone produced when the crushing plant is in operation, goes into the concrete silos. These silos, when full, will meet the kiln requirements for two weeks. The average operation of the

The new lime plant is on the very edge of the quarries. Stone crushing plants are on the right, the kiln building is in the center and the loading out and hydrating building is on the left. Note the network of pipes into the large lime silos, where lime is stored according to quality


NO.1 QUARRY
#1 HOIST
NO.2 QUARRY
NO.3 QUARRY
NO.4 QUARRY
NO.5 QUARRY
TRUCK
SHOVEL
ROAD
ROAD
#4 HOIST
SCALPING SCREEN
SKIP HOIST
BELT CONVEYOR
#10 K.G. CRUSHER
SKIP FEEDER
WELL DRILLER
5 SHOVEL
WELL DRILLER
3 HOIST
CAR
STONE TRUCKS
E. SHOVEL
R.R. TRACKS
TRUCK
CAR
SCRUBBER
SCREENS
BELT CONVEYOR
BELT CONVEYOR
#8 K.G. CRUSHER
#25 K.G. CRUSHER
SCREENS
BUCKET ELEVATOR
SAND WASHER
LOG WASHER
STONE BINS
TRUCKS & CARS
REVERSIBLE TRANSFER BELT CONVEYOR
SCREENS
99' CTOC BUCKET ELEV.
#22 K.G. CRUSHER
STONE BINS
BELT CONV.
TRUCKS & CARS
#25 K.G. CRUSHER
PULVERIZED LIME BIN
AGRICULTURAL LIME BIN
CHEMICAL LIME BIN
BELT CONV.
BELT CONV.
BELT CONV.
PACKERS
PACKERS
PACKERS
TRUCK
BOX CAR
TRUCK
BOX CAR
BUCKET ELEV.
SEPARATOR
SURGE BIN
VOLUMETRIC FEEDER
HOPPER
FAN
BALL MILL
R.R. TRACKS
COAL HOPPER
SCREEN
BELT CONVEYOR
TO CARS
MAGNETIC CONV.
ATOX MILL
FEED BIN FOR PULVERIZER
BELT CONV.
PEBBLE BIN
FEED BIN FOR HYDRATOR
SCREW CONV.
BELT CONV.
BAGS & BARRELS
BUCKET ELEVATOR
BOX CAR
HAMMER MILL
BUCKET ELEV.
HYDRATOR
MATERIAL PUMP
BELT CONVEYOR
BELT CONV.
FEED BIN
FEED TABLE
KILN
ROLL CRUSHER
COOLERS
COAL PULVERIZER
COAL FEED BIN
SKIP HOIST
LIME SILOS
SCREEN
SKIP HOIST
STONE SILOS
DUST CHAMBER
SKIPULTER
COAL BELT CONVEYOR
HOPPER
BELT CONVEYORS
COAL BELT CONVEYOR
ELEV.
COAL SILO
COAL BELT CONVEYOR

Kennedy No. 25 crusher at its normal setting produces 300 tons of kiln stone in a day's run.

When necessary to remove kiln stone from the silos, it is reclaimed on a Link-Belt conveyor, 80 ft. 2 in. centers, in a tunnel beneath the silos. Stone is released from the silos to the belt through six F. L. Smidth bin gates, manually operated to vary the rate of flow. The conveyor discharges into a hopper serving a skip hoist.

This 40-cu. ft. Link-Belt skip hoist is automatic in operation, but may be operated manually. The hoist is a type RS1 drum, 30-in. diameter and 18-in. face. The rope speed is 165 f.p.m. (through Cutler-Hammer control). The solenoid breaker operates on the time-clock principle, allowing a definite time for filling, for the bucket to travel to the top of the silos, and for its emptying and return for another load of stone. The bucket discharges 90 ft. above ground, or 20 ft. above the top of the silos.

Provision is made to receive stone from stockpiles or bins by trucks, which discharge into the skip hoist hopper. This stone may be discharged to the kiln feed bin direct by the belt conveyor, 106-ft. centers, or may go to the silos.

Stone from the kiln feed bin is fed into the kiln by an F. L. Smidth table feeder, synchronized with the kiln drive through a General Electric 4-speed motor and a Falk 4DA reducer, 21.3:1 ratio. The four motor speeds are 430 r.p.m., 575 r.p.m., 850 r.p.m. and 1145 r.p.m.

The Kiln

Lime is made in a 290-ft. Unax kiln, designed and manufactured by F. L. Smidth & Co., New York, N. Y., and is similar in design to those with integral coolers in use in the cement industry. The kiln is of riveted construction, supported at five points and has the standard slope of ½ in. to 1 ft. The first 92 ft. 2¾ in. of its length from the firing end is 8 ft. inside diameter followed by a 10 ft. 1 in. length of tapered section, and the remaining length has a 6 ft. 6½ in. inside diameter. The cooler provides the means for discharging and cooling the lime, and transferring this recovered heat to the incoming secondary air for combustion.

The first 75 ft. of kiln length from the feed end is the preheating zone. Special heat exchange elements (blades) in the kiln, installed to lower the temperature of the stack gases, by transferring it to the stone, are said to be the equivalent of 42 ft. of additional length.

The entire kiln is lined with Harbison-Walker refractory brick. The first 9 ft. ⅞ in. is lined with semi-hot zone block; the next 40 ft. with Alusite, a 70% alumina block; and the next 20 ft. is lined with 60% alumina Anchor Brand, followed by 164 ft. 10⅝ in. of Harbison-Walker special block and 56 ft. of Tyrone special wear resisting liners in the preheating zone.

The firing end of the kiln is not insulated. Johns-Mansville Superex is the insulator used for a distance of 187 ft. 7¾ in. from the feed end of the kiln.

The brick lining for the first 93 ft. 2⅞ in. of the kiln is 7½ in. thick, and for the remainder of the kiln is 4 in. thick. The Superex insulation is 2½ in. thick, with a thin layer of Johns-Manville insulating cement between the lining and the insulating block.

Burner Controls

The kiln draft is induced, for constancy in burning conditions at the firing end of the kiln. Air is pulled through the cooler and kiln(at the rate of 20 cu. ft. per second) by a type 24 FLS fan (made by the Buffalo Forge Co.) and vents through the 100-ft. concrete stack lined with 4½-in. fire brick. First, the air coming through the kiln passes through an F. L. Smidth retainer, or dust chamber, where dust is caught and collected. Dust from this chamber is loaded into motor trucks which transfer the fine product to the pulverizing plant. Ninety-five per cent

DATA ON MACHINE DRIVES

Designation	*Electric power*	*Drive*
No. 1 belt conveyor to stone silos	7½ hp.	Falk 56RZ, ratio 71:1
No. 2 belt conveyor to stone silos	5 hp.	Falk 44RZ, ratio 63:1
Belt conveyor to reclaim stone from silos	5 hp.	Falk 44RZ, ratio 63:1
Stone skip hoist	20 hp.	Cutler-Hammer
Induced draft fan	15 hp.	Link-Belt silent chain
Kiln feeder	5 hp. (4 speed)	Falk 4DA, ratio 21.3:1
Kiln	50 hp. (4 speed)	Falk 12½ RA, 160:1
Coal mill feeder	¾ hp.	Cleveland 100AH, 69:1
Coal pulverizer	30 hp.	V-belt
Coal blower	20 hp.	Link-Belt Dodge V-belts
Skipulter	15 hp.	Falk 6DA, 14:8
Bowser oil pump for pulverizer	1 hp.	direct connected
Coal crusher	25 hp.	flat belt-Rockwood base
Coal conveyor-crusher to elevator	5 hp.	44RZ Falk, 63:1
Coal elevator	7½ hp.	40DZ Falk, 21.2:1
Second coal conveyor	5 hp.	40DZ Falk, 32:1
Reclaiming conveyor	5 hp.	40DZ Falk, 32:1
Skip hoist	7½ hp.	Cutler-Hammer
Vibrating screen	3 hp.	Link Belt Dodge V-belts
Reclaiming conveyor for lime (south)	5 hp.	40RZ Falk, 56:1
Reclaiming conveyor (north)	5 hp.	40RZ Falk, 56:1
Lime conveyor above silos	5 hp.	44RZ Falk, 63:1
Short lime reclaiming conveyor (south)	2 hp.	28RZ Falk, 56:1
Short lime reclaiming conveyor (north)	2 hp.	28RZ Falk, 56:1
Pebble lime elevator	10 hp.	RZ70 Falk, 46:1
Dings magnetic pulley	3 hp.	Dings reducer
Lime vibrating screen	5 hp.	Link-Belt Dodge V-belts
Magnetic coal separator at feeder	20 hp. DC & 10KW	
Shuttle conveyor for pebble lime	5 hp.	40RZ Falk, 53:1
Conveyor to hydrate feed bins	5 hp.	40RZ Falk, 56:1
Box car loader	7½ hp.	silent chain
Screw conveyor to lime pulverizer	3 hp.	James reducer, 15:1
Hammer mill	50 hp.	direct
Elevator to hydrator	7½ hp.	40RZ Falk, 45:1
Feeder to hydrator	½ hp. Master geared head	
Hydrator	20 hp.	70RZ Falk, 56:1
Elevator to separator	7½ hp.	40RZ Falk, 45:1
Separator	25 hp.	Gates Vulco V-belt
Material pump	no motor	
Screw conveyor to surge bin	1½ hp.	Link-Belt PIV variable drive
Screw conveyor from surge bin	1½ hp.	Link-Belt PIV variable drive
Tube mill for hydrate	75 hp.	Philadelphia gear reducer, 42:1
Fan, tube mill	15 hp.	direct
Packing machines (3)	7½ hp.	
Loading conveyors (3)	2 hp. reversible	Falk 28RZ, 56:1
Screw conveyor carrying bulk pulverized lime to bagger	2 hp.	Falk, 30:1
Fan for lime pulverizer	25 hp.	Link-Belt Dodge V-belts
Lime pulverizer (quick)	60 hp.	Link-Belt Dodge V-belts
Viking oil pump for pulverizer	1½ hp.	
Feeder	¾ hp. D.C.	Cleveland 100AH, 69:1

ABOVE: Kiln stone is carried to storage from the new crushing plant in center by overhead conveyor. Stone is readily transferred from the new crushing plant to the washing and dry screening plant on right

ABOVE: Stone feeder and primary gyratory crusher in new secondary crushing plant
BELOW: Reclaiming belt conveyor from stone plant bins discarges to a secondary crusher for further reduction

of this product, containing a high percentage of stone dust, passes the 200-mesh sieve.

Ahead of the induced draft fan is an FLS louvre damper, controlled from the burner's panel, to regulate the draft from zero inches to a maximum.

Temperatures are maintained at 2300 to 2400 deg. F. in the hot zone, while the exhaust stack temperature is approximately 700 deg. Leeds & Northrop "Micromax" pyrometers and temperature recorders are used. All kiln temperatures, draft conditions and burning conditions register on a single F. L. Smidth control panel board, where the burner operator is stationed, and are controlled from that point.

Gas Analyses

Exhaust gas conditions are observed and recorded through an F. L. Smidth gas analyzer on the induced draft fan floor, which registers on the centralized control panel. By this instrument, the gases are controlled to 30% CO_2 and 1/10 of 1% CO + H_2.

Four kiln speeds are possible; and the speed is readily changed from one to another to meet conditions as determined by analysis of the lime. The kiln is turned by a 50-hp., 4-speed General Electric motor, having speeds of 430, 585, 855 and 1175 r.p.m. through a 160:1 Falk reducer. The stone feed is synchronized with the kiln speed as already described. The rollers on the five kiln supports run in water on which oil is floated. As an emergency drive in event of electric power failure, a White gasoline motor, complete with a clutch, may be readily connected to drive the kiln through a chain on sprockets. The kiln may be turned in either direction by this motor.

Coal Fuel

The kiln is fired with pulverized coal. Coal is brought in by bottom-dump cars and discharged through a track hopper to a Jeffrey 24x24-in. single-roll crusher. This crusher was installed to reduce coal sizes to ¾ in. and under, when run of mine coal may be brought to the plant. Generally ¾-in. slack coal is specified. Then the crusher serves as a feeder to the belt conveyor carrying coal to storage. A 50-ton car of coal is handled to the bins in half an hour.

A 20-in. Link-Belt belt conveyor discharges the coal to the boot of a Link-Belt bucket elevator. The elevator discharges either into a 500-ton coal silo or to a Link-Belt shuttle conveyor, which in turn discharges into the coal pulverizer feed bin. Coal may be reclaimed over a Link-Belt conveyor beneath the coal storage bin and sent by the same elevator to the shuttle conveyor, when the coal pulverizer feed bin is fed from storage.

In event of a tie-up in railroad serv-

ice, coal may be brought in by truck and carried by the same reclaiming belt conveyor to the boot of the elevator from which it may pass either to storage or to the feed bin by way of the shuttle conveyor.

The coal feed bin has a capacity of 30 tons, sufficient for more than a day's run of the kiln. The flow of coal from the feed bin to an F. L. Smidth Atox coal mill is regulated by an F. L. Smidth feeder powered by a direct-current motor having a speed range of 500 to 1500 r.p.m. The motor speed is regulated from the kiln control board. Coal is pulverized to a fineness of 99.8% through 200-mesh, of which 92% passes 300-mesh.

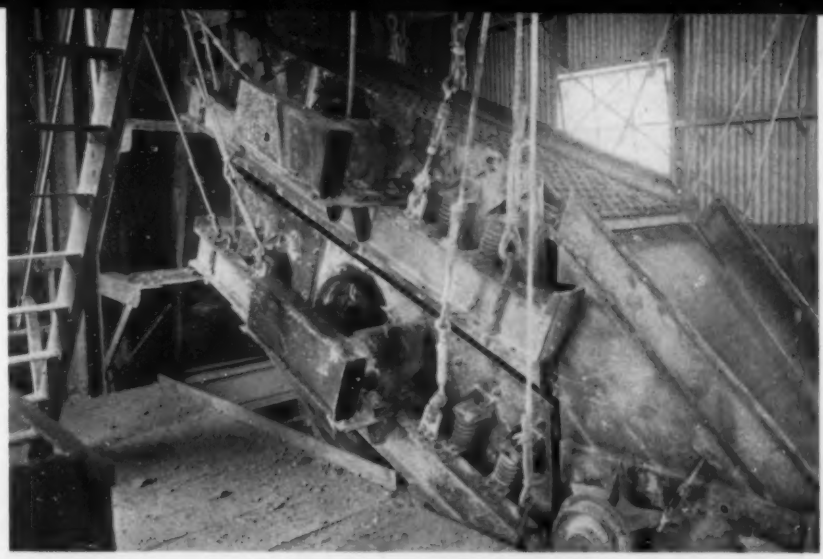
Primary air, representing about 30% of the combustion air, is taken from the kiln and tempered by cold air so that the temperature of the air entering the coal pulverizer does not exceed 165 deg. F. This temperature is just sufficient to remove the 3 or 4% of moisture in the coal and not high enough to ignite the coal. The pipe from the kiln to the blower is insulated with 2 in. of asbestos covering. The primary air temperature is regulated from the centralized control panel.

Lime coming from the kiln discharge travels an up-hill path through the coolers, where it is raised by spiral lifters, or flights, requiring an hour to pass through the cooler. In passing through the cooler, the lime temperature is dropped from 2300 deg. F. to 150 deg. F. and the secondary air is raised to 800 deg. F. before entering the kiln. The mixture of pulverized coal and primary air is injected into the kiln through an F. L. Smidth burner.

Control Features

The kiln speeds are determined by analysis for variations affecting over- and under-burning of the lime, such as the stone size, differences in moisture content and variations in the quality of the coal. Stone requires from five to six hours to pass through the kiln. Lime emerging from the cooler passes direct through a chute to an F. L. Smidth, 18-in. skipulter, which in turn discharges to a hopper for the skip hoist to the proper bin.

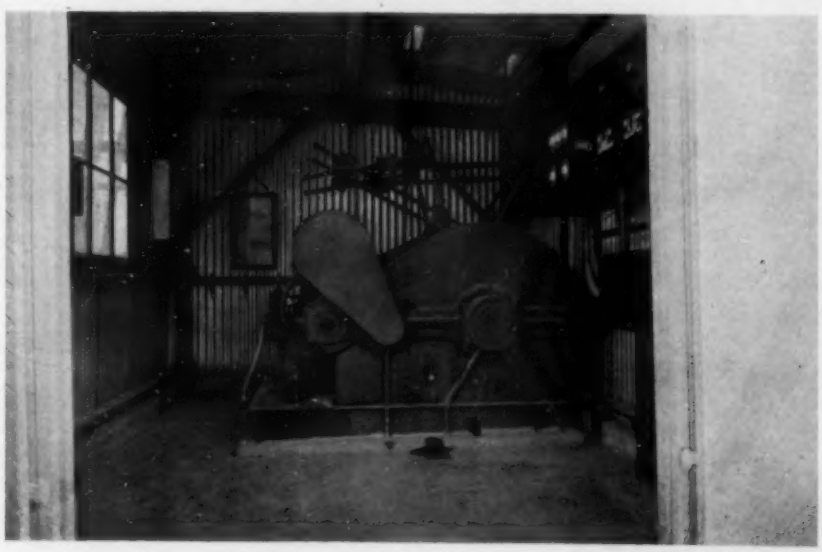
Control, especially in regard to quality of the lime, is exercised at the burning floor and also by an inspector at the skipulter. Specimens of lime are taken every 20 minutes by the burner operator and this inspector. The burner operator screens and accurately weighs his specimens to determine the purity, and the degree of over- and under-burning, and corrects either condition by his control board before the lime, from which the specimens are taken by him, reaches the inspector at the skipulter an hour later.



Stone is sized over two triple-deck vibrating screens, one placed directly over the other and operating as a single 6-deck screen

***ABOVE:** Kiln stone may pass directly to storage from the left belt conveyor or transfer to a conveyor discharging to the kiln feed bin*

***BELOW:** Control room for the automatic skip hoist which places stone from trucks into storage and also reclaims stone from storage*



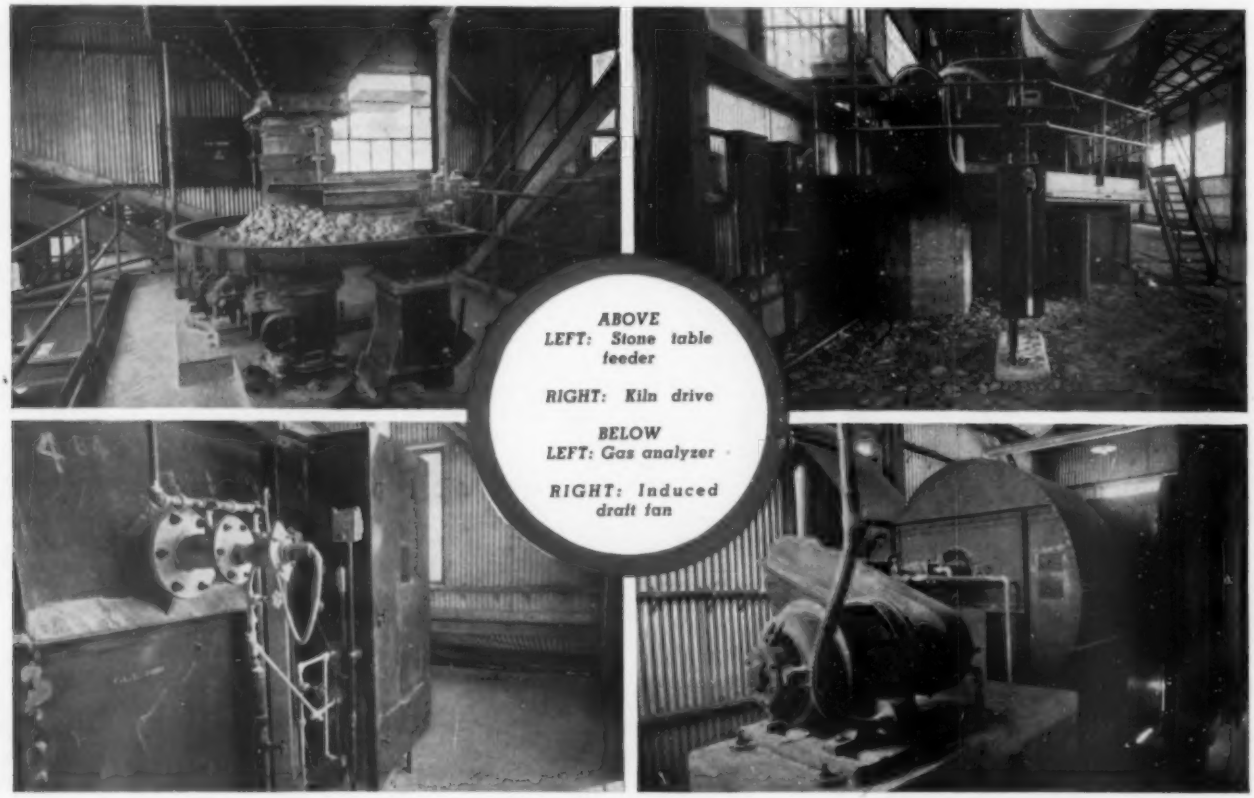
The 290-ft. rotary kiln as seen from the feed end

The latter inspector runs a slaking test at his station adjacent to the skipulter every 20 minutes, and a man hand-picks any faulty lumps of lime from the skipulter. Lime from the skipulter is diverted to any of six lime storage silos, according to quality, by push-button controls, and the lights at the inspector's station. Analyses are taken from every car of out-going lime, and each car must be approved by the chemist before it is allowed to leave the plant. For the convenient carrying out of all necessary tests and analyses, a complete chemical laboratory is being installed adjacent to the burner floor. All control of the entire plant converges to this floor.

Lime Handling

The Link-Belt 20-cu. ft. skip hoist bucket discharges to a Link-Belt, triple-deck, 4x6-ft. vibrating screen above the lime storage silos. The type RS½ hoist has an 18x24-in. drum size and has a cable speed of 65 f.p.m. by Cutler-Hammer control. The hoist is automatic in operation.

At present, this vibrating screen is separating out the fines (minus ¼-in.) which make up considerably less than 20% of the total lime. The original stone feed to the kiln is plus 1¼ and



ABOVE
LEFT: Stone table feeder

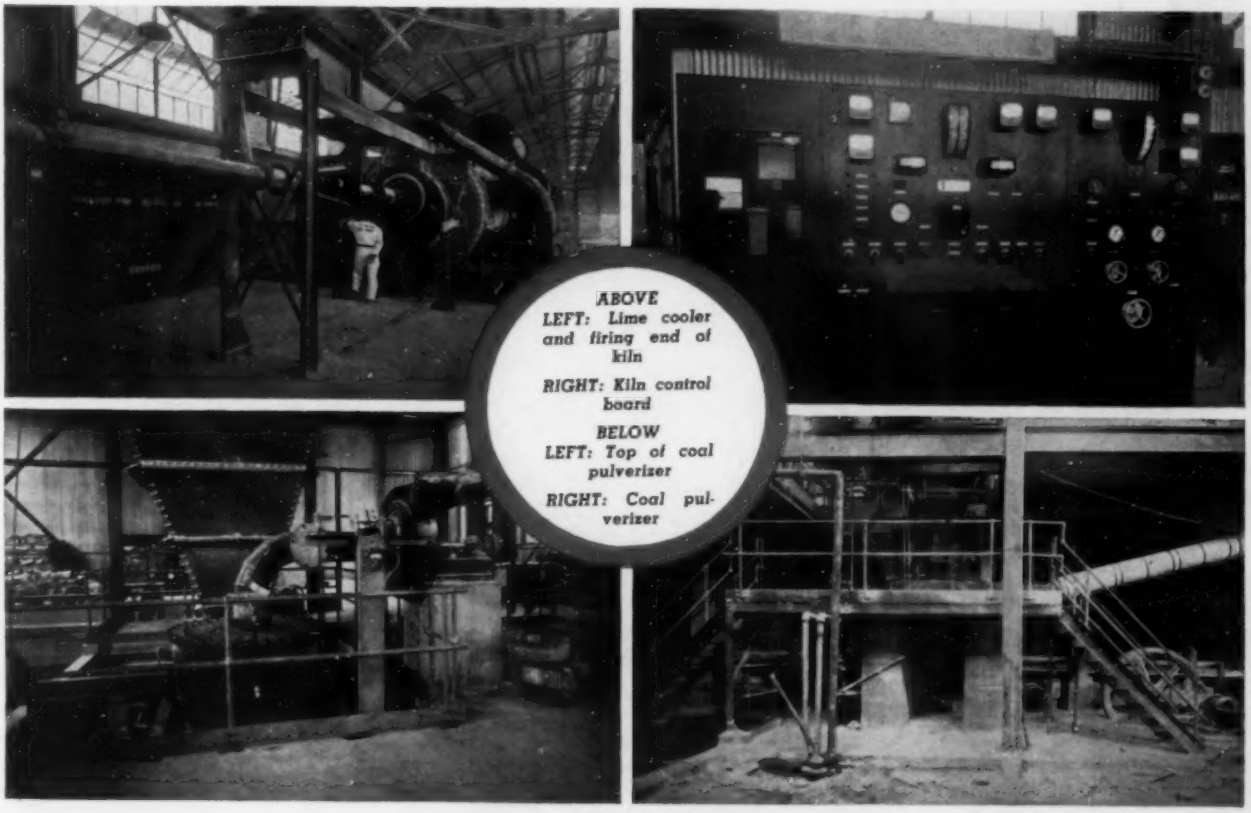
RIGHT: Kiln drive

BELOW
LEFT: Gas analyzer

RIGHT: Induced draft fan

Firing end of the kiln and burner floor where all controls for the plant converge. The lime cooler is integral with the kiln. Below the firing floor may be seen the lime conveyor

minus 2½-in. stone, and the lime is all minus 1¾-in. in size. The fines are spouted to the No. 5 silo and ultimately go to the hydrating plant, while the plus ¼-in. stone is graded on a quality basis and sent to separate silos. Six



ABOVE
LEFT: Lime cooler and firing end of kiln
RIGHT: Kiln control board
BELOW
LEFT: Top of coal pulverizer
RIGHT: Coal pulverizer

Coal pulverizer and burner pipe to the kiln for primary air and coal. A feeder regulates flow of coal to pulverizer from bin

concrete silos have a capacity of 1000 tons each and the two star, or interstice, bins each hold 200 tons of lime. Any quality of lime may go direct to the pebble lime bins over a Link-Belt horizontal belt conveyor, 69 ft. centers, followed by a vibrating screen.

Lime is reclaimed from either of the eight silos over one of two parallel Link-Belt conveyors, 90-ft. centers, below the silos, lime being fed from the silos by F. L. Smidth gates. There are eleven gates above each belt conveyor. Each of these conveyors discharges to a Link-Belt belt conveyor, 15-ft. centers, traveling on a 15-deg. incline to the boot of a Link-Belt bucket elevator, 72-ft. centers, equipped with special gravity takeups.

The elevator discharge may go direct to cars or be passed over a Link-Belt, 4x10-ft., triple-deck, enclosed, vibrating screen, just ahead of the conveyor, after first passing a Dings magnetic pulley for the removal of tramp iron.

From the screen, the lime may go in either of three directions. It may go direct by the Link-Belt belt conveyor, 49-ft. centers, to the lime pulverizer bin or to the hydrator feed bin; it may go to the pebble lime loading bins below; or may by-pass the bins to a shuttle conveyor for direct loading of cars. The pebble loading bins have provisions for bag and barrel loading of pebble lime direct through spouts extending to the floor of the building. The Link-Belt shuttle conveyor, 50-ft. centers, is designed not only to load box cars on the railroad track, but will load open-top rolling stock on the far track, the conveyor being mounted on rails permitting its extension 14 ft. out from the building. Pebble lime, or granular lime of any size from ¼ in. down, and free from dust, may be loaded to cars in this way.

In addition, the shuttle conveyor may discharge through a chute to a Manierre box-car loader. This loader is mounted on a full swivel and may be rotated 180 deg. when loading lime into trucks. Incidentally, all truck loading is done within the lime storage and hydrating building. The box-car loader may load pebble or granular lime into the farthest recesses of box cars at the rate of three tons per minute. Lime is not loaded out according to scales, but by use of a bin capacity chart based on the weight of lime per cubic foot. The loading out operation is controlled electrically by bin switches by one man stationed at the control board where he can see every unit in operation. Bin-dicators are provided throughout the plant on all the smaller capacity bins which are filled and emptied frequently. Each pebble bin has a capacity of 35 tons, from which lime is loaded out to order.

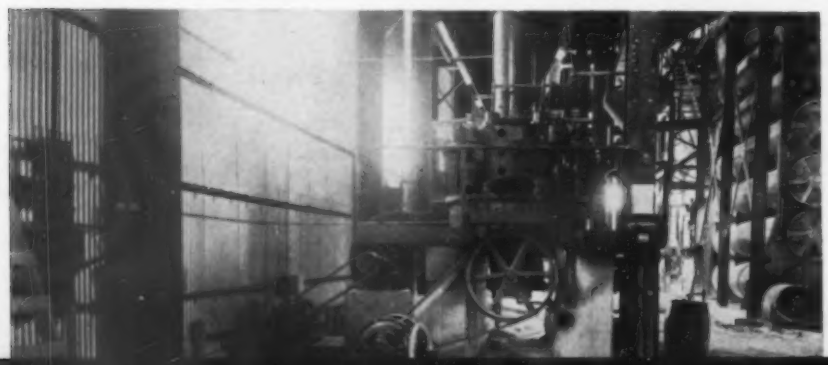
Going back to the vibrating screen, lime not passing direct to cars, or the pebble loading out bins, passes over a Link-Belt conveyor, 69-ft. centers, to either the hydrator or lime pulverizer feed bins, each of which holds 150 tons of lime.

Lime from the pulverizer feed bin feeds to an F. L. Smidth Atox mill, which is a combination pulverizer and separator, through an F. L. Smidth direct-current operated feeder. Granular and pulverized lime are produced simultaneously by setting the separator for granular lime. Lime is pulverized to a fineness of 99% through the 200-mesh sieve. Fineness is controlled through cyclones, dampers and stationary separators.

An interesting feature of the plant is the packing floor located 14 feet above the working floor, so that lime passes direct to cars and trucks by reversible belt conveyors and gravity chutes.

Granular lime is removed to its bin adjacent to the pebble lime bins on the loading-out floor by fan, while pulverized lime is similarly placed in a pulverized lime bin of 100-ton capacity. Pulverized lime may be loaded out in valve bags by a two-spout machine, or placed in open-mouth bags or barrels by screw conveyor, or it may be loaded out in bulk. A reversing 24-in. belt conveyor, 16-ft. centers, with flat belts loads bags to cars in one direction or to trucks in the other.

Pulverizer for the manufacture of agricultural and granular lime



Hydrator Plant

Lime from the hydrator feed bin feeds by gravity to an 8-in. screw conveyor to a type A2 Jeffrey hammer mill with ⅛-in. grates. All lime is ground

to minus 8-mesh in this hammer mill before going to the hydrator. Generally, after passing through the hammer mill, 35% of the lime will pass 300-mesh. In event of a breakdown or other emergency, lime may bypass the hammer mill to the boot of a Link-Belt bucket elevator, 52-ft. centers, equipped with automatic take-up. Minus 8-mesh lime also passes up the elevator.

The elevator discharges to a surge bin, for the hydrator feed, of less than one-ton capacity. The surge bin is filled as an automatic batcher with top and bottom limits set by Bin-dicators. The hammer mill and elevator are in continuous operation, the screw conveyor being automatically started and stopped, with the surge bin taking up the slack. Lime flow to the hydrator is regulated by a Hardinge volumetric feeder, the lime passing through a pug mill before entering the Kreitzer large type hydrator. The water of hydration is furnished by high pressure sprays in the stack, the blanket of spray reducing the dust loss in the stack to a minimum.

A tunnel has been constructed to store 5000 tons of crude hydrate on the outside, to give the seasoning effect of silos. This hydrated lime may be returned to the plant and processed according to the demand for shipments.

The capacity of the hydrator is 10 tons of hydrated lime per hour. A Link-Belt elevator, 47-ft. centers, carries the hydrate from the hydrator discharge to a 14-ft. Gayco air separator. The fines (99% minus the 325-mesh) discharge to a Kennedy pump, which extrudes 1900 lb. of lime at one time. The pump

Fine hydrate from the separator is pumped to the chemical lime bin by a materials pump. Rejects go to the surge bin and are pulverized in the air-swept tube mill on left

is operated by compressed air at 35 p.s.i., and works on the weight principle, automatically, and extrudes hydrated lime every five minutes through a 5-in. line to the chemical lime and hydrate packing bin. The Gayco separator rejects return to a 4x8-ft. Kennedy, gearless, air-swept tube mill where they may be reduced for chemical hydrate or for agricultural lime. The mill fan elevates the fines to four Kennedy 4-ft. cyclones into the agricultural or masons' lime packing bin, or the mill may operate in closed circuit through cyclones to the elevator feeding the Gayco separator. All cyclones and the piping were furnished by the Kennedy Van Saun Manufacturing & Engineering Corp.

The agricultural and chemical lime bins each hold 50 tons. Lime is packed by a three-spout Valve Bag Co. packer from either bin into valve bags and is loaded either into cars or trucks by a reversible Link-Belt conveyor belt, 16-ft. centers.

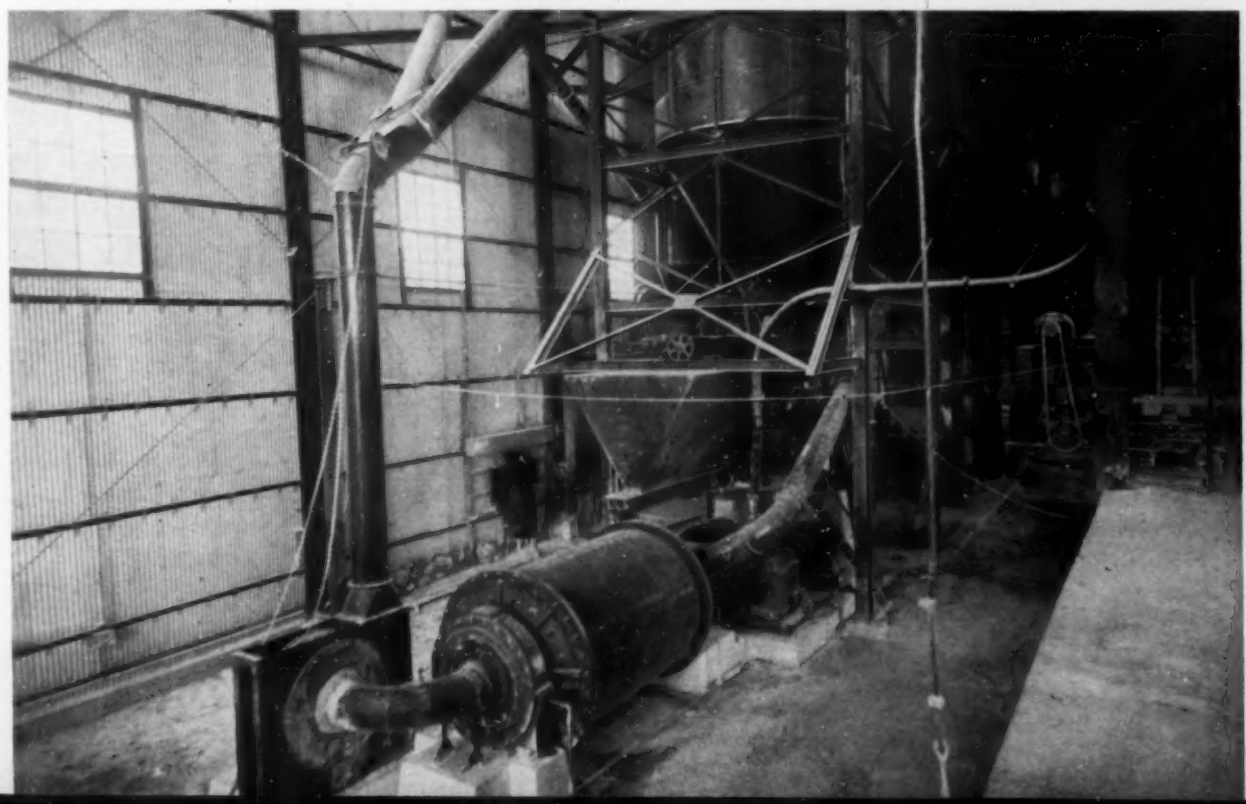
Products manufactured are masons' lime, agricultural lime, chemical lime, pebble lime, granular ground and pulverized lime.

Hydrate is shipped in 50-lb. valve bags and granular, pulverized and pebble lime are shipped in 80-lb. bags or in 180 and 280-lb. wood or steel barrels furnished by the International Cooperage Co.

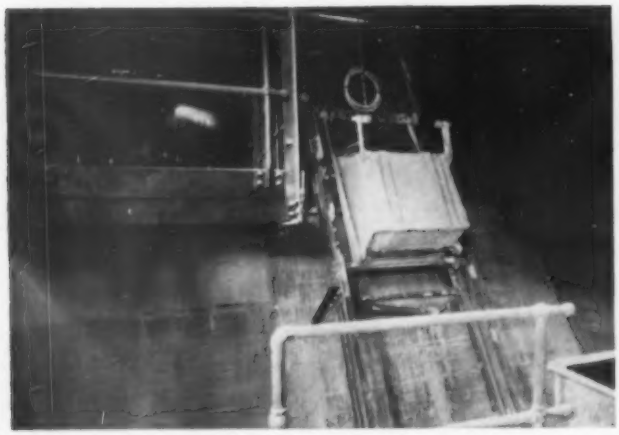
General Data

The new crushing plant and kiln installations were completed seven months after construction started, including the silos; and the loading and hydrate plant construction was completed in six months.

View of lime handling equipment from the bagging floor. Air separator rejects are fed to the air-swept mill on the left from the V-shaped surge bin.



CONVEYORS AT MILLARD LIME PLANT



Lime is elevated by skip hoist to the storage silos or direct to the agricultural or hydrate feed bins

The skip hoist is entirely automatic in operation, taking a definite period of time for each trip to the silos

Lime reclaimed from silos over the belt conveyor on left passes over a magnetic conveyor in center for removal of tramp iron

After passing the magnet, lime discharges over the triple-deck screen in center. Some is stored, and the remainder goes over the belt conveyor to the hydrate and agricultural lime bins

Coal is reclaimed from its storage bin by belt conveyor to fill the coal feed bin, which in turn feeds the coal mill

Lime from the kiln is carried by this special conveyor to the skip bucket. Analyses are conducted at this point

The plant has low power consumption, and has anti-friction bearings throughout.

Every operation is numbered by a special system by which all labor and materials for operation and maintenance are charged direct to a unit of machinery rather than to a department.

Stone and lime handling equipment has been installed to handle double the requirements and output of the new kiln, and the building has space and provisions for installing a second kiln at a future date.

All belt conveyors and belt and bucket elevators are Link-Belt. All belting in the stone plants is U. S. Rubber Co., and in the lime plant Thermoid and Hewitt Rubber Co.

All equipment throughout the new lime plant is driven by General Electric motors.

Water Supply

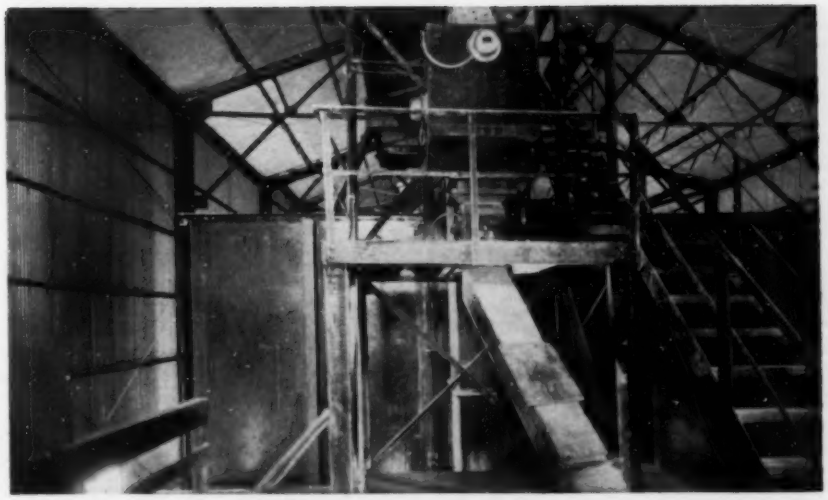
The entire plant water system is laid using Johns-Manville Transite piping instead of the conventional steel water pipe in common use. To serve the new plant, a concrete water reservoir of 50,000-gal. capacity was built on the neighboring hillside. This reservoir was designed to serve the additional purpose as a swimming pool in an ideal wooded environment.

Personnel

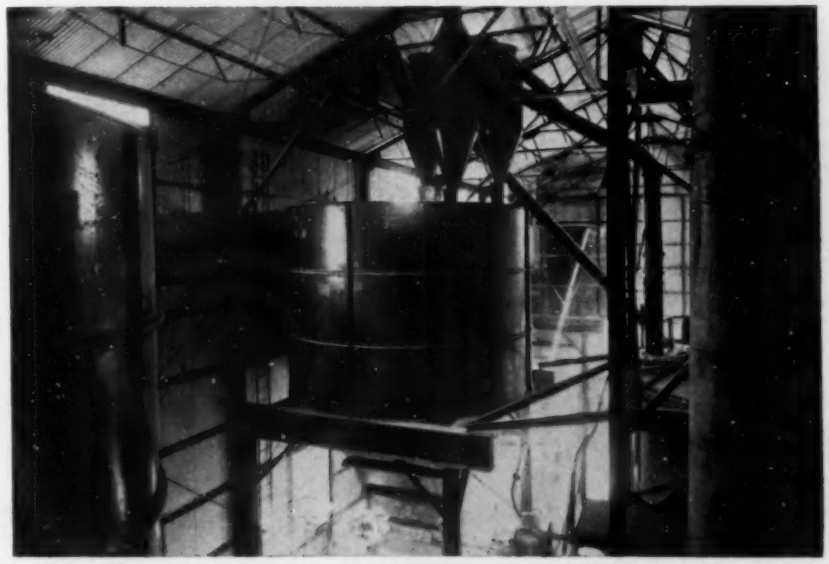
All concrete silos were built by the M. A. Long Co., contractor, Baltimore, Md. The structural steel was fabricated by Frank M. Weaver, Lansdale, Pa., while F. L. Smidth & Co., New York, N. Y., designed the rotary kiln plant complete from the point where the conveyors load the kiln feed bins to the point of discharge of the lime to storage. The hydrating plant was designed by W. R. Cliffe, chief engineer, who previous to his association with H. E. Millard, had had many years of experience in the operation of rotary kiln lime plants, particularly with the American Lime and Stone Co., Bellefonte, Penn.

In addition to the primary crushing plant at Annville, which has a capacity of 500 tons of crushed stone per hour, Mr. Millard has stone plants at Swatara, Penn., and Millardsville, Penn., of 500-ton and 1000-ton hourly capacities, respectively. Fluxing, building and chemical lime are produced at the Palmyra plant by 13 mixed-feed shaft kilns of 150 tons a day capacity, while the producer-gas-fired lime plant at Swatara has a daily capacity of 200 tons from eight shaft kilns.

At the east end of the Annville quarries, a unique formation containing much high calcium decomposed limestone rock is being worked. A 1-yd. Erie shovel loads this stone direct from the quarry into industrial cars. The pulverizing plant, at this writing, is

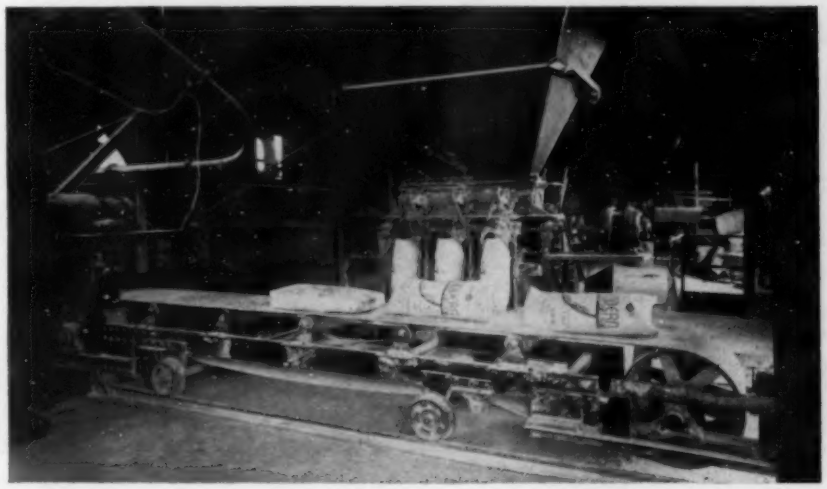


Automatic measuring devices on the surge bin above a volumetric feeder control the flow of lime to the hydrator



ABOVE: Hydrate pulverized in the air-swept tube mill is piped to the agricultural bin through cyclones

BELOW: A two-way conveyor loads cars to the right and trucks to the left



being remodeled to increase its capacity of fine stone products from 100-125 tons a day to 500 tons.

Some 25 to 30 trucks haul finished stone products and lime from the various plants to the job. Two 10-ton, semi-trailer Autocar trucks haul lime to the coal mines and return with coal, the retailing of which is a side issue at his own yards. Mr. Millard operates his own concrete aggregates batching plants at times for the proportioning concrete for special large jobs. At this writing 45 one-yd. batches per hour are being hauled from one of the batching plants for the paving of U. S. 422 east of Annville, a season's job.

Some 40 dwellings are maintained on the Millard-owned stretch of land from Annville to Palmyra, Penn., for the housing of employes and an additional 20 homes are provided at Millardsville.

E. D. Williams is general superintendent and manager of all the Millard properties. J. B. Millard, son of H. E. Millard, serves as superintendent of the Swatara and Palmyra plants. Dr. Andrew R. Bender, professor of chemistry, Lebanon Valley College, Annville, is chief chemist, and is assisted by H. S. Kinney.

Expanding

Cook & Co., 960 Ocean Ave., Portland, Ore., have recently expanded their sand and gravel business by addition of two concrete mixer trucks. The firm has also employed Wallace Purrington, consulting engineer, Concord, Mass., to make tests and advise contractors or other customers on concrete mixtures.

Buys Limestone Deposit

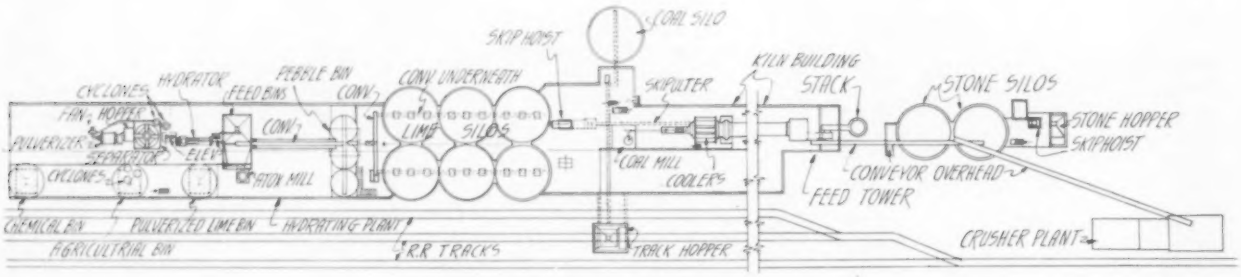
Mitchell Bay Lime Co., Seattle, Wash., has purchased 20 acres of limestone deposits near Maple Falls, Wash. The company has other quarry properties on Orcas Island and at Darrington. It is said, the Maple Falls deposit will be quarried for pulp mills.

End of Wisconsin Codes

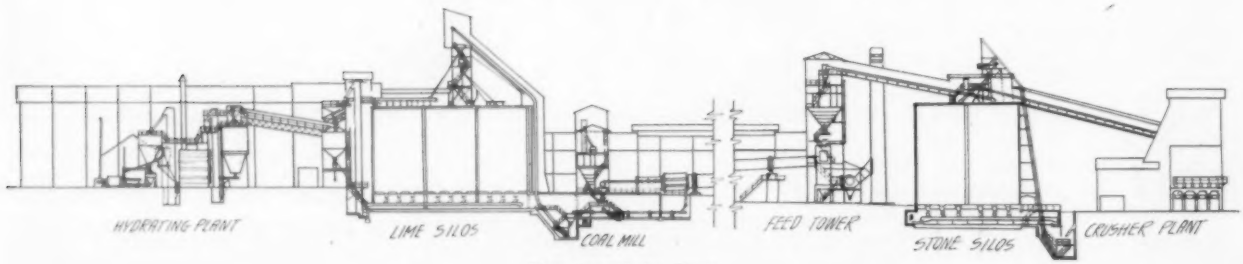
Wisconsin's "little NRA" which set up state-wide trade practice codes modeled after the NRA codes in various industries, including crushed stone and sand and gravel, died July 25, the state legislature refusing to renew its life beyond the "emergency" it was designed to meet. Some liked it, others did not. It made price-fixing legal, but could hardly be said to have been an unqualified success. There were, and always would have been, too many ways of getting around it. Following the collapse of the code organization an attempt is being made to revive the Wisconsin Mineral Aggregates Association.

Moves Headquarters

Powhattan Lime Co., Strasburg Junction, Va., is moving its home office from Richmond, Va., to the plant. F. H. Zea is president. This is the company that the late Warner Moore headed for years.



General plan of the Millard plant



Elevation of the plant

A group of employes at the Millard plant

(Left to right) Messrs. Millard, Williams, Cliffe, Dunlap

More Business Baiting

THE CEMENT INSTITUTE is the latest target for an attack on American business. It is charged by the Federal Trade Commission with violation of both the anti-trust laws and the Robinson-Patman act. The complaint is aimed chiefly at the multiple basing point system of quoting prices, which results in price uniformity. The cement industry is only one of nearly all basic commodity industries which use the basing point price system.

The outcome of the case will be of wide interest to all business men in-so-far, at least, as it develops a new interpretation of the Robinson-Patman act. So far as its anti-trust features are concerned, these were apparently settled once for all several years ago when the United States Supreme Court rendered one of its famous rule of reason decisions to the effect that uniformity of prices of a basic, standardized commodity is evidence of competition rather than the reverse.

The Federal Trade Commission's complaint alleges: "The effect of the respondents' combination upon the public interest has been and now is:

"(1) To bring about the disappearance of prices arrived at through the play of competitive forces, and the adoption by concert of organized producers of prices calculated to preserve the more poorly located, equipped, and conducted units at the expense of the buying public;

"(2) To lessen the demand for cement and the volume of public and private construction in which cement is used;

"(3) Correspondingly to lessen the opportunities for employment, both in the cement industry and in the construction industry;

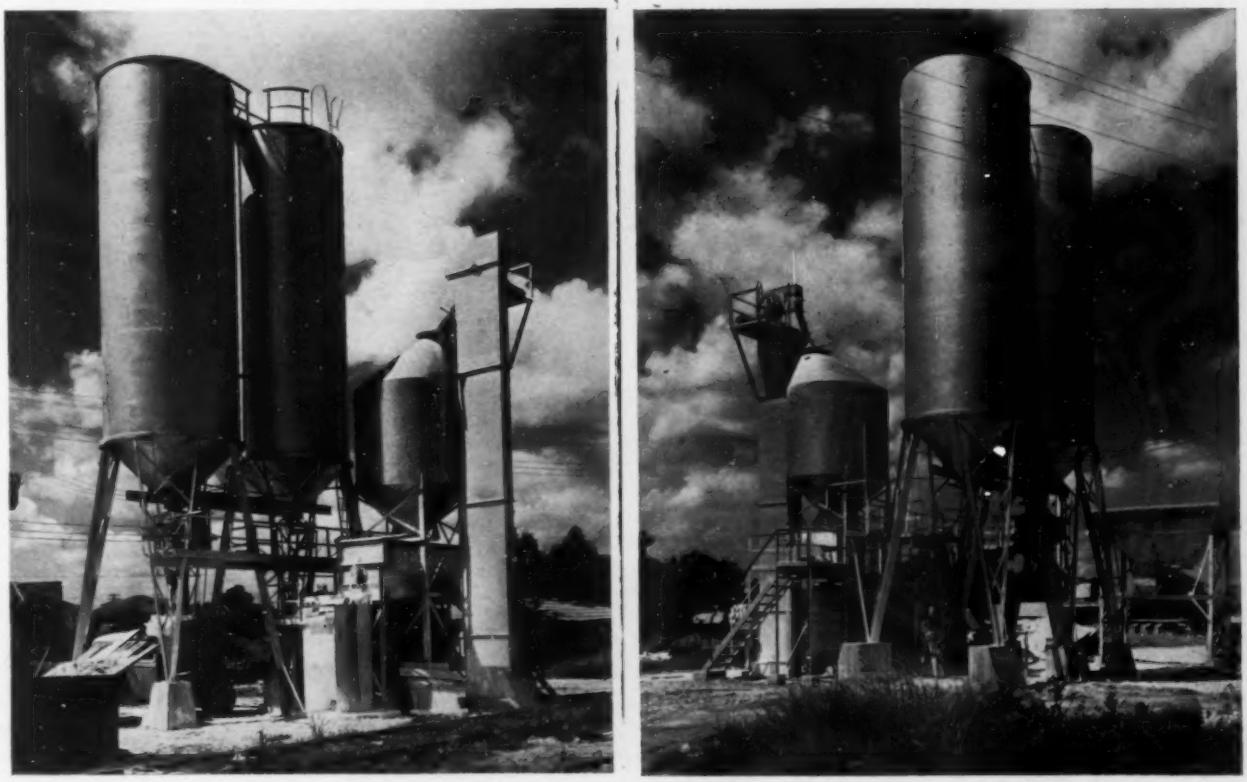
(4) To raise the cost of public roads and projects and private structures in which cement is used and thereby either to make them less available to the public or to raise the taxes and rents by which the public pays for them;

"(5) To encourage the development of excess capacity by the inducement of high prices and of fictitious freight charges obtainable by mills not located at basing points."

Even to our poorly informed layman's point of view these charges do not appear to make sense. For example, how could "the respondents' combination" preserve "poorly located, equipped and conducted units at the expense of the buying public" and "lessen the opportunities for employment" all in the same breath? Of course, every man of sense knows that if the cement mills could be moved about so as to be near the places of large use of cement, the cement could be made more cheaply with less employment. But it seems to us, since the places of most use are constantly changing, and one can not change the location of the mills, public interest demands that the maximum number of mills be kept in producing condition, that neither public nor private users ever be placed at the mercy of the few mills that might survive another process of pricing.

New Putty Plant

EVER-READY MIXED MORTAR, INC., 4616 Main St., Houston, Tex., started operation of a new Brooks-Taylor process lime-putty plant, the second week in July. The owners are the Black-Broiller Co. Mr. Lee Broiller, president, was formerly sales manager of the Haden Co., Houston, sand and gravel, and lime producer and building supply dealer. The starting of the new putty plant was celebrated by a barbecue attended by some 200 architects, engineers, contractors and brick masons. Also, Hayden Brooks, president of the Brooks-Taylor Co., Birmingham, Ala., was present and explained the process to the assembled guests. The company uses truck mixers for mixing and delivering the mortar made from the aged lime putty.



New process-lime-putty plant of the Ever-Ready Mixed Mortar, Inc., Houston, Tex., from two angles

Arkansas River Sand Company

REPLACES ELECTRIC with DIESEL POWER

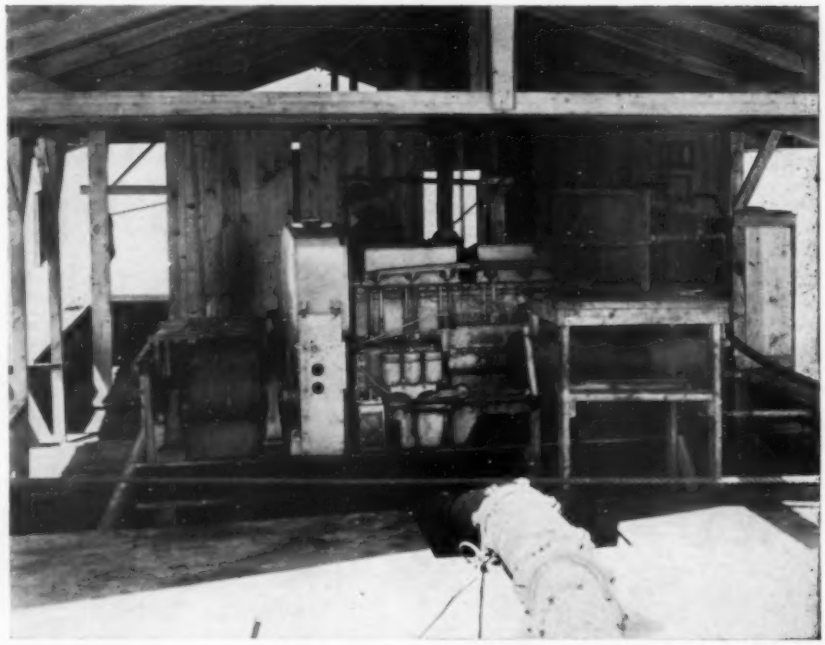
For Pump Dredge Operation

FIVE YEARS of scanty rainfall in the Arkansas River watershed created a new operating condition near Sapulpa, Okla., for the Arkansas River Sand Co., Tulsa, Okla. Not only was rainfall short but more water was removed from the river for irrigation purposes.

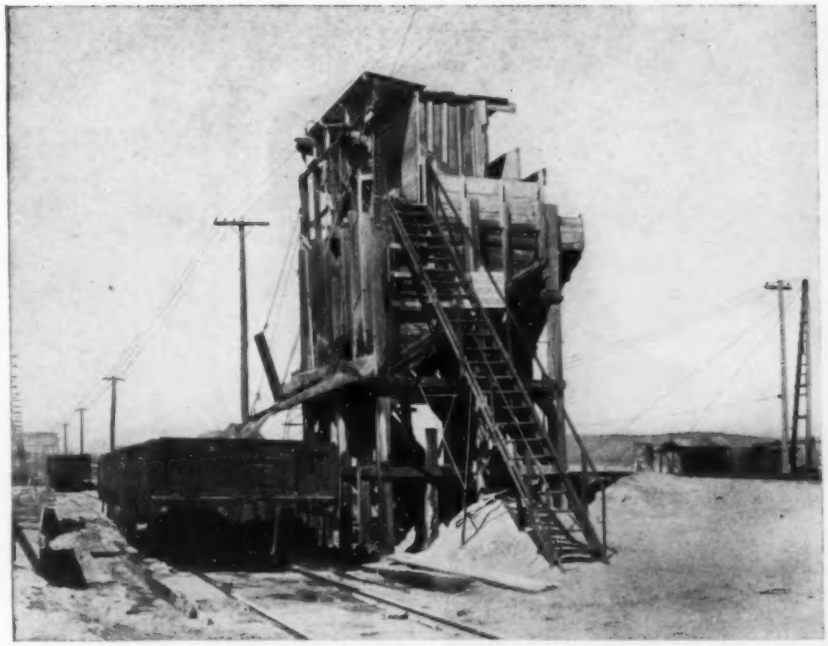
This resulted in insufficient river current to send the sand to the dredge when operated, as heretofore, near the plant. It was necessary to go farther and dig deeper—thus calling for more power.

Hitherto purchased electric power had been used. With the increased power requirement it was decided to use a Diesel engine, direct-connected to the 8-in. pump. The power selected was a 6-cylinder Caterpillar Diesel, rated at 125 hp. The substitution of Diesel power with 6c per gal. fuel oil for 2¾c per kw.h. electric power has cut the out-of-pocket operating cost about $225 per month.

Another advantage of the Diesel over the electric power is the avoidance of contending with electric-power cables



ABOVE: Diesel engine drive of Arkansas River Sand Co.'s dredge pump. BELOW: Typical conditions met with in dredging operation



Washing and loading plant of Arkansas River Sand Co.

when making pipe changes and when moving up and down the stream. Also, trouble was often experienced with the electric cables during periods of high water when there is considerable drift material in the river.

By installation of a heat-exchanger on the engine it was possible to save 8 or 10 hp. that is required in portable installations for turning the fan on the radiator. With a heat exchanger the cooling water for the engine is pumped from the river and kept in circulation, thus eliminating the need for a fan.

W. E. Rogers is president of the Arkansas River Sand Co., and to him the editor is indebted for the details herewith.

Changes Hands

ELKHART-MORAINE LAND AND GRAVEL Co., Elkhart Lake, Wis., passed into new hands recently when A. A. Laun, president and one of the founders of the company, sold his interest to O. L. Hall, president of the Bank of Sheboygan, Sheboygan, Wis. Mr. Laun, with his brother, Louis Laun, and Jacob Reineck founded the company in 1909. Both of the partners have since died. Mr. Laun expects to devote all his time to other business interests.

Expansion

PAINTED POST SAND AND GRAVEL Co., Corning, N. Y., has acquired the gravel plant of Norman Rogers on Canada road and will operate it with A. E. Scudder, Painted Post, as manager.

New Plant

CENTRAL ROCK AND SAND Co., Sanger, Calif., has completed and placed in operation a new $70,000 sand and gravel plant. The company is a partnership composed of Dr. Earl O. Vahne, a Fresno, Calif., dentist, and Wallace G. McAllister, fomerly with the Thompson Construction Co., Fresno. They have been operating an old plant on the same site for a year and a half. The new plant has reinforced-concrete bins, washing equipment and is said to be thoroughly up-to-date.

Closed by Racketeers

STEWART SAND AND MATERIAL Co., Kansas City, Mo., had its operations closed for about a week late in June by roving bands of hoodlums who drove employes off the job at the point of the gun. The company's employes were not directly involved in the Kansas City labor war which gave rise to the lawlessness.

Absorbs Subsidiaries

CHANDLER MATERIALS Co., Tulsa, Okla., announced July 1, the purchase of stocks, assets and good-will of the Hughes Stone Co., Oklahoma Cement Pipe Co., Price Sand Co., and the O K Sand Co. In the future they will be operated as departments of the Chandler Materials Co. The consolidation involves no change in personnel or policy, the officers of the new company being the same as in each of the merged companies with J. M. Chandler, president; T. R. Dean, vice-president, and Claude W. Chandler, secretary-treasurer. These men also represent the board of directors and are the sole owners of the company. The properties transferred by the Hughes Stone Co., in addition to its original quarry which it has operated at Garnett for more than 25 years, include the stone quarry, until recently operated by the Monarch Cement Co., the quarry at Price, formerly operated by the Zenith Limestone Co., and another property at Garnett, operated by the Tulsa Stone Co., a total of 550 acres.

Sand and Gravel Statistics

U. S. BUREAU OF MINES reports that available data on consuming markets for sand and gravel and incomplete returns from producers indicate that the total output of commercial and noncommercial plants in 1936 was 172,660,000 short tons valued at $88,747,000. This apparent increase of 39% in tonnage and 43% in value from 1935 continued the upswing that began in 1934 following a sharp decline from 1929 to 1933.

Sales of sand for all important uses increased in 1936 compared with 1935. Building sand and gravel, in particular, reflected the sharp upturn in construction and production of paving sand and gravel likewise showed a substantial increase. Purchases of ballast by railroads were much higher than in 1935. The increased output of industrial sands paralleled the continued pickup in glass, foundry, and dimension stone industries and in railroad traffic.

Despite increased demand for sand and gravel for all uses in virtually every section of the country, average prices in 1936 showed little change from 1935. The average value per ton, f.o.b. plant, for all sand and gravel reported by commercial producers remained unchanged at $0.61. A slight weakness in sand prices resulted in a drop of 2c a ton in the average value of sand but it was balanced by an advance of 2c for gravel.

Production of sand and gravel by plants operated by or directly for states, counties, municipalities or other local government agencies apparently increased in 1936 at about the same rate as commercial production. Preliminary data indicate an output of roughly 53,000,000 short tons compared with 39,316,452 tons in 1935. The average value of this material advanced from $0.27 a ton in 1935 to $0.30 in 1936.

To Dissolve

COOGAN GRAVEL Co., Peoria, Ill., has filed articles of dissolution with the Illinois secretary of state.

Increased Fuel Efficiency and Clinker Grindability

EFFECTED BY NEW EQUIPMENT

Installed by Diamond Portland Cement Company

REDUCTION IN FUEL AND ELECTRIC POWER COSTS, increased kiln operating efficiency and improved clinker grindability are the outcome of modern equipment installations recently at the Diamond Portland Cement Co. plant, Middle Branch, Ohio. The firing ends of both 10x150-ft. kilns were completely modernized, with the installation of Vanderwerp heat recuperators and individual Raymond Bowl mills for direct firing.

The 6-ft. recuperators form an integral part of each kiln and reduce the temperature of cement clinker to approximately 1000 deg. F. at the discharge end of the kiln, while returning the recovered heat to the kilns to be used in the calcination process. None of this available heat was recovered until the recuperators went into operation in March, 1937. The recuperators operate in combination with Raymond Bowl mills in that the air through the recuperator plates is blown through the hot clinker bed, delivering to the kiln preheated secondary air needed for combustion of the pulverized coal coming from bowl mills. Each recuperator delivers about 12,000 cu. ft. of air at atmospheric temperature from a size 55 Norblo fan.

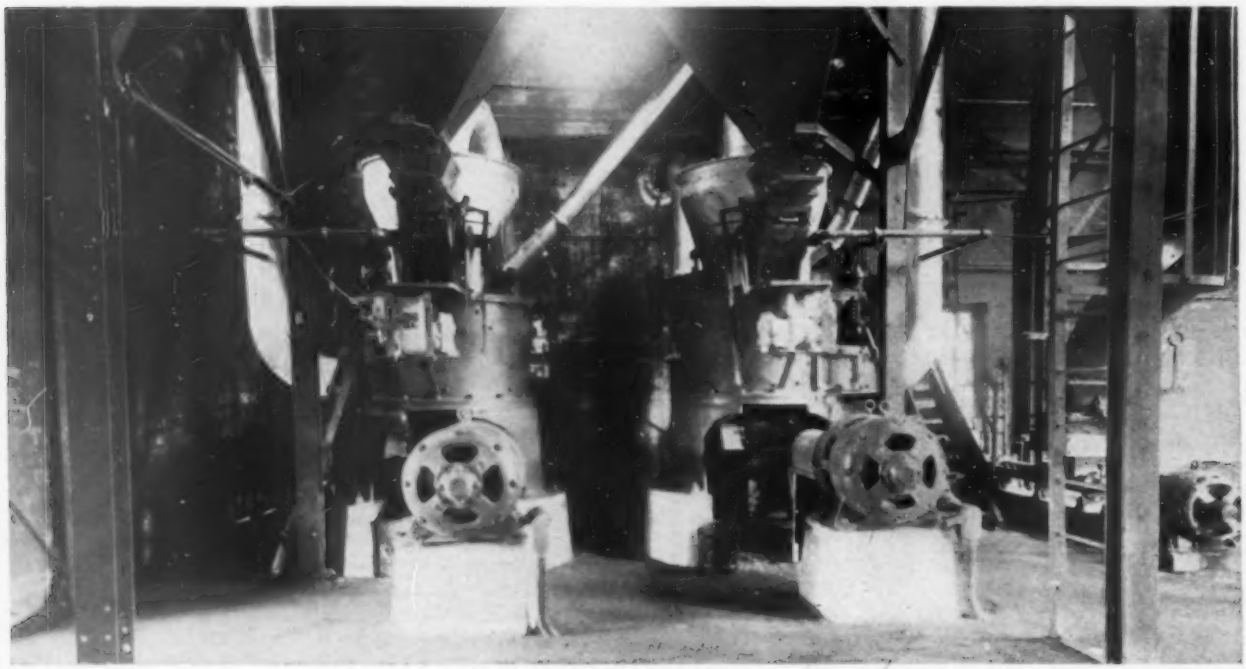
The No. 402 Raymond Bowl mills have simplified the firing operation as well as brought about reductions in the fuel ratio per barrel of cement; replacing coal pulverizers, air separators, a coal dryer, individual fans used to blow coal into the kilns and fans for a dust collecting system. The new units have been installed in the old coal mill department adjacent to and below the kiln firing floor.

Coal Handling

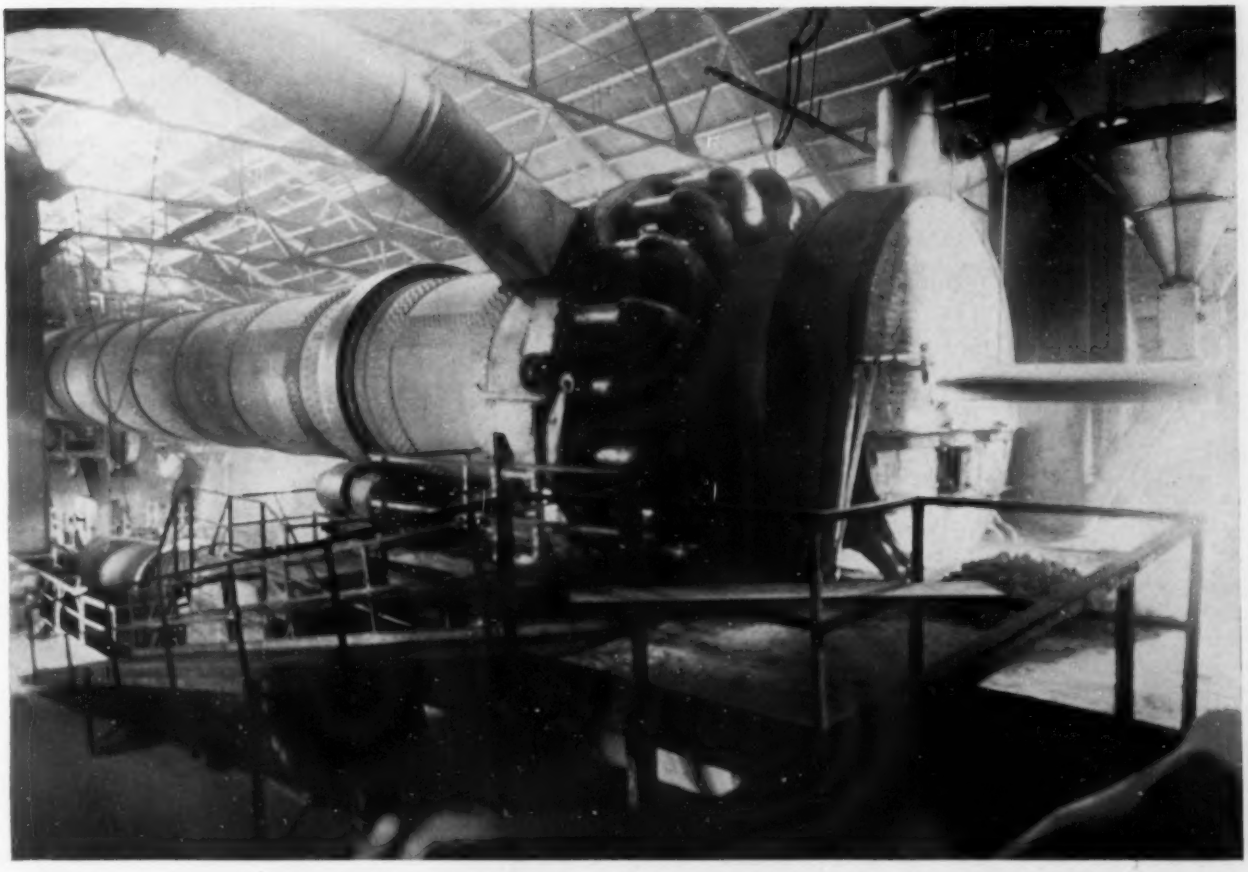
Coal is now received in minus 1¼-in. size, in bottom-dump cars discharging to the boot of a bucket elevator. Where, formerly, coal was spouted from the elevator head to the dryer below, it now discharges to a 24-in. belt conveyor carrying it to the coal bins directly above the Bowl mills.

Two 150-hp. motors were required to drive the old pulverizers, two 75-hp. motors to drive fans or blowers, and a 25-hp. motor to drive the coal dryer and were eliminated. The new coal system requires two 100-hp. motors to drive the Bowl mills, a 7½-hp. motor on the belt conveyor and several fractional horsepower motors, representing a reduction of some 265-hp.

One of the old coal bins, of 40-ton capacity, has been made over into a pants-leg bin to feed the two mills



View of two coal mills with sloping 8-in. pipes to skim off some of the coal for raw material dryer as it goes to kiln



One of the new recuperators. On the right are air separators to collect dust in air pulled from kiln hoods; air enters from pipe above on left

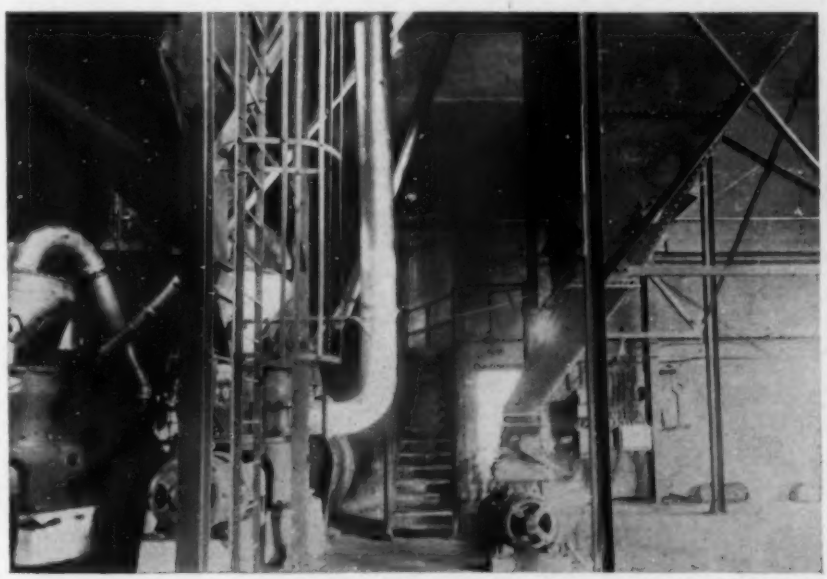
below. Coal is fed from the bin into the mills by automatic feeders driven by small variable speed motors.

Primary air at about 500 deg. F. is taken from top of the kiln hood, in each case, tempered with atmospheric air so as to maintain a constant temperature of 180 deg. F. in mill. This heated primary air, representing about 30% of air required for combustion, dries and conveys the pulverized coal to the kilns through a 14-in. pipe. The other 70% of air needed for burning (secondary) is that put into the kilns from the recuperators. The hot air taken from the kiln hoods to the Bowl mills is first passed through two 4-ft. air separators, where dust is removed and returned to the clinker conveyor taking clinker from the kilns.

The new mills are capable of pulverizing 3 tons of coal per hour to a fineness of 92% passing the 200-mesh sieve; iron pyrites, bolts, nuts and other objectionable material being removed by the centrifugal action of the mills. These accumulated rejects are removed from a small door in the bottom of each mill.

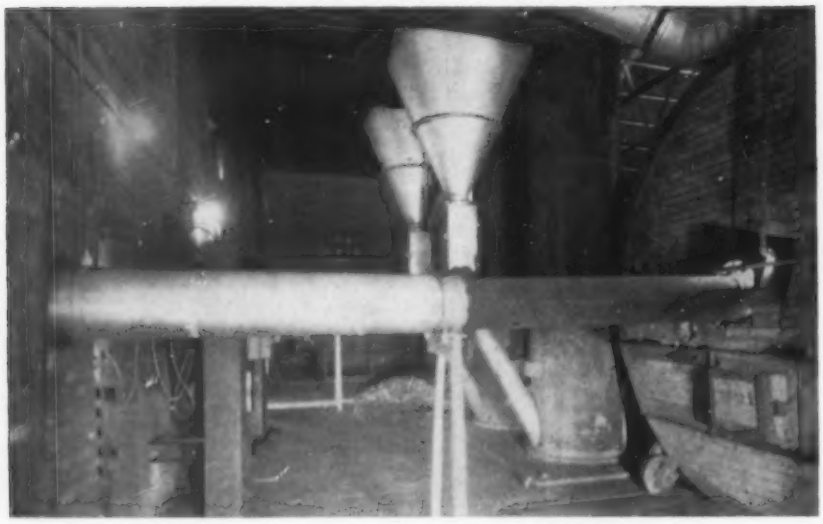
Coal for Dryers

The new mills, in addition to firing the kilns, are so installed as to furnish a ready supply of pulverized coal for firing the stone and shale dryers. The vertical 14-in. pipes conveying the mixture of pulverized coal and primary air to each kiln have been tapped, and an 8-in. diameter pipe inclined slightly from vertical has been welded to each



View showing 8-in. pipes to skim off coal for use in stone dryer (pump on right, coal mills on left)

Two sloping pipes on left carry coal from each coal mill to a bin



Two separators that catch dust in air pulled from kiln hoods

Coal is brought in by railroad and carried by belt conveyor to coal mill feed bins

14-in. pipe. The purpose of the second pipe is to "skim off" some of the pulverized coal. The amount of coal skimmed off is regulated by a hand-operated gate at the junctions of the pipes.

Directly above a 40-ton capacity bin, the 8-in. pipes discharge to two 3-ft. air separators, from which the coal is dropped by gravity to the bins. The air passes on out through stacks in the separators. The fan in each Bowl mill performs this added function.

A 4-in. Fuller-Kinyon pump below the separator bin pumps the pulverized coal to the coal bins at the dryer, to the burner on which it is fed by a screw conveyor and fan. Approximately ten tons of coal are skimmed off each day through the 8-in. pipes.

Better Clinker

The recuperator installations, in addition to saving much valuable heat formerly wasted, by sudden air quenching have made possible production of a much easier grinding clinker and consequently a higher grade final cement. The Bowl mill installations have made savings both in power and fuel consumption as mentioned, and have also eliminated much dust and dirt, materially bettering working conditions. The explosion hazard, always present where quantities of pulverized coal are kept on hand, no longer exists.

Expects Good Business

MANITOWOC PORTLAND CEMENT CO., Manitowoc, Wis., resumed production in June. During the shutdown period numerous improvements were made to keep the plant abreast with the latest developments in the industry. The Diesel-powered ship *Daniel McCool*, one of the first bulk cargo carriers equipped with Fuller-Kinyon cement pumps and bagging facilities has been overhauled and placed in commission again.

Protest Favoritism

WABASH PORTLAND CEMENT CO., with plant at Strobe, Ind., but its bins across the state line in Osborne, Ohio, and KOSMOS PORTLAND CEMENT CO., Kosmosdale, Ky., have filed a protest with the Indianapolis board of public works, alleging that it is unfair to cement manufacturers outside the state in not allowing contractors engaged in public work in Indianapolis to buy from them. According to the *Indianapolis News* "board members explained that for several years a sort of gentlemen's agreement had existed between the city and contractors whereby four Indiana cement concerns had received the business."

LIME PRODUCERS' FORUM

Conducted by Victor J. Azbe, Contributing Editor, St. Louis, Mo.

KILN TOP TEMPERATURES AND KILN HEIGHTS*

IT WAS SHOWN in previous articles in this series that even when conditions are as nearly perfect as theory will permit them, gases leaving the kiln will still be comparatively hot. While often they may be found much cooler, it is because they are diluted with air leaking in at the kiln tops, or because stone was just charged. Neither of these affect the true average terminal temperature of gases coming up through the kiln. The only ways by which this true temperature may become modified are listed below:

It will reduce through:

(1) Stone containing magnesium carbonate.

(2) Moisture in the stone.

(3) Core in the lime.

(4) Charging of fuel in mixed-feed kilns.

It will increase through:

(1) Excess air passing through the dissociation zone.

(2) Radiation from the hot zone of the kiln.

(3) Drawing of hot lime from the cooler.

(4) Unbalanced drawing of lime.

(5) Moisture from fuel or injected steam.

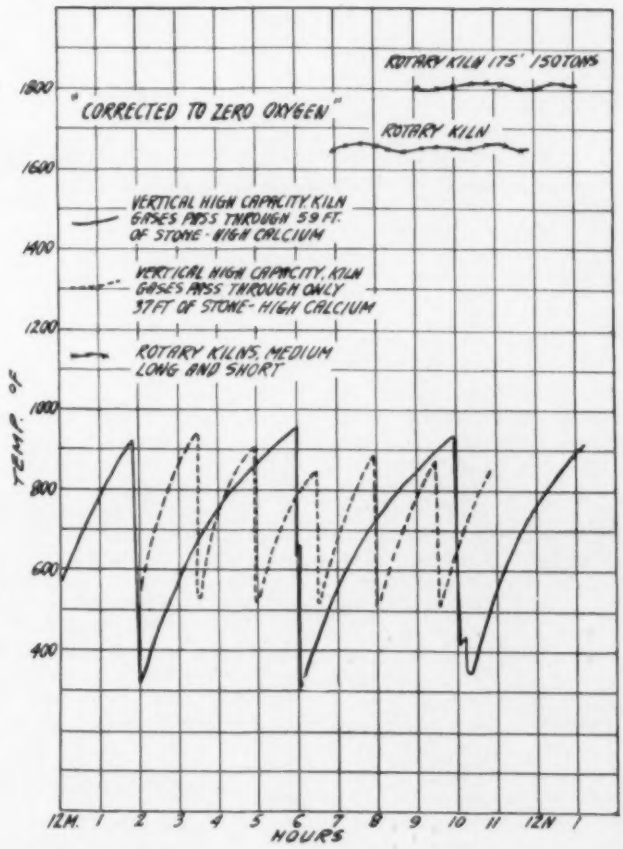
(6) Recirculated kiln gases.

(7) Secondary combustion.

Kilns burning dolomite, of course, have much lower top temperatures, as they should also have higher capacities and fuel ratios for reasons often discussed by the writer; and their performances should be judged in their own class. If gases from a kiln on dolomite are hot, they must be so either through intermittent charging of long lapses or through some very glaringly poor operating conditions.

Moisture is a factor but not an important one. In the case of our perfect kiln, if the stone contained 1% of moisture the heat loss of 157 B.t.u. on top would be reduced by only 10 B.t.u. and would not have any effect on the kiln anyway.

That core in the lime should cool the top of the kiln, sounds queer, but it just means that there is more stone coming down to cool the gases, also more heat coming up through the cooler, all making the kiln more efficient from the heat standpoint, which would be all right except, of course, that we don't want core in the lime. With mixed-feed kilns not only stone but the fuel as well are pre-heated and that gives lower top temperatures.


ROTARY KILN 175' 150 TONS
"CORRECTED TO ZERO OXYGEN"
ROTARY KILN
VERTICAL HIGH CAPACITY KILN GASES PASS THROUGH 59 FT. OF STONE - HIGH CALCIUM
VERTICAL HIGH CAPACITY KILN GASES PASS THROUGH ONLY 37 FT. OF STONE - HIGH CALCIUM
ROTARY KILNS, MEDIUM LONG AND SHORT
TEMP. °F
1800
1600
1400
1200
1000
800
600
400
12M. 1 2 3 4 5 6 7 8 9 10 11 12N 1
HOURS

While excess air tends to cool the hot zone, it is one of the important factors of heating the top. Air leaving the dissociation zone has a heat capacity of 400 B.t.u. per lb. This heat would have made lime while in the preheating zone, it is of no use whatsoever. In the case of our perfect kiln a mere 20% of excess air reduces the amount of heat available by 57 B.t.u., thus reducing the amount of stone coming down the kiln, and so actually causing a loss at the kiln top of 71 B.t.u., increasing the loss from 157 to 228 B.t.u., and raising the top temperature from 550 deg. to 720 deg. F. Just this 20% which, by the way, is considered in no way abnormal, can increase gas consumption per ton of lime by 400 cu. ft. Moisture or recirculated gases have a similar effect.

Radiation from the hot zone, as well as the drawing of hot lime from the cooler, raises top temperatures because it extracts the useful heat that would make lime, increases the proportion of heat of low temperature and reduces the amount of stone coming down the kiln to cool the escaping gases.

Temperature rise through secondary combustion is caused by incomplete combustion in the dissociation zone and the escape of carbon monoxide which, in the upper kiln portion, may get air coming up some other channel or may get the air through a leaky kiln top. Fuel burned to CO in the dissociation zone makes hardly any lime at all, and if it burns later in the preheating zone, it is of no help.

Even a good kiln will have an average top temperature of 700 deg. F., which pyrometers may not show, due to air inleakage. The only safe way is to take the temperature and simultaneously analyze the gas; then reduce the temperature to zero oxygen condi-

* Part of a paper delivered at the 19th annual convention of the National Lime Association, Chicago, Ill., May 12, 1937.

tions, when surprisingly high results will be obtained. This has all been explained before in the Lime Forum.

Kilns driven at a high rate had this 700 deg. F. temperature. It was thought that if the kilns were higher, gas temperatures would be less. But by experimentation it was found that gases were leaving at practically the temperature of the stone, with virtually no terminal temperature difference, which proved not only that kilns were not too low, but that they were actually higher than needed. What makes high kilns necessary is not the necessity for a high preheating zone, but rather for night stone storage. High capacity kilns, if not fairly high, are half empty by morning. But with this fully realized, the internal shape of a kiln changed greatly, and with proper provisions the possible capacity of comparatively small kilns becomes great if night charging is possible.

Fig. 1 shows interestingly the terminal temperatures reduced to zero oxygen, of several different vertical and rotary kilns. The strangest are two kilns operating each at 55 tons, in one of which gases pass through 59 ft. of stone and the other through 37 ft.; yet both have practically the same top temperature. This seems very important.

HIGH TENSION WIRES KILL

But They Do Not Stalk Their Victim

HERE'S THE STORY of another needless fatal accident that occurred a few weeks ago in a cement plant. It's worth reading for its lesson—for this accident might easily occur in almost any aggregate, lime, gypsum or concrete plant operated by a ROCK PRODUCTS reader.

The victim was electrocuted when he disregarded instruction and continued a painting job toward a high tension line that had been placed so low that it was too easily accessible. Contact with deadly electric wires is not a new cause of fatalities in industry. It has been a very frequent cause for years and most of the contributing factors in this case seem to have been commonplace lapses that could easily have been prevented.

The circumstances of this case were very simple. A 2300-volt power line passing over a shale shed was supported on low brackets as shown in the accompanying sketches. These brackets, mounted on the ridge of the roof, carried the wires over the building with only 2 ft. clearance above the ridge and with only 14½ in. clearance between the nearest wire and a large metal ventilator.

A repair and painting job was required on the roof and a foreman sent four men up to take care of the work. The foreman warned the men repeatedly, individually and collectively, against approaching too close to the high tension line. The man who soon after came in contact with the line was instructed to paint only the sides of the ventilator away from the line. Since these wires carried no current on Sundays and at certain other times, the side of the ventilator next to the wires was to be painted later when the line was dead.

While the foreman was momentarily absent on a necessary errand but with other members of the gang present—with persons below who may have realized the danger but assumed a shouted warning would be superfluous—the victim started painting at the point he had been told to leave unpainted. Shortly thereafter his left hand and right hip touched the near wire of the line. Death was instantaneous but none of his companions saw the final act in this tragedy of carelessness.

What was the cost? How can it be calculated? The victim, a young man 22 years of age, left a widow and one child who are thus deprived of his support. However, expensive although inadequate the compensation may be, it probably will not represent more than one-fourth of the full cost of the accident. The only way in which anything can be salvaged from this unfortunate occurrence is to use the knowledge gained from it in an effort to prevent its repetition.

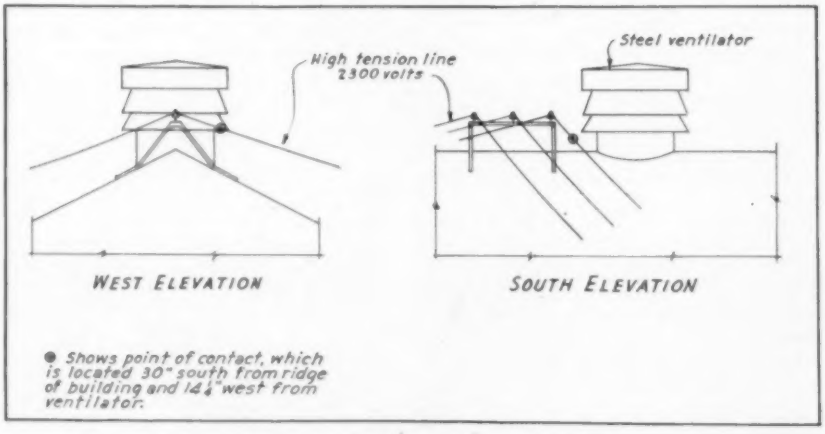
Lessons to Be Learned

Here are some of the lessons it should teach:

(1) No high tension line should be placed so low or otherwise accessible that it can be touched by any person (other than an electrician) in the course of his duties. This should be a rule without any exceptions. A higher bracket placed at greater distance from the ventilator probably would have prevented the accident. (This line is to be raised at once to give a clearance of 8 ft. above the roof.)

(2) Under circumstances such as prevailed no one other than an electrician should have been allowed on the roof.

(3) Where, as in this instance, an ex-


High tension line
2300 volts
Steel ventilator
WEST ELEVATION
SOUTH ELEVATION
● Shows point of contact, which is located 30" south from ridge of building and 14½" west from ventilator.

Location of Fatal Accident on shale shed roof

posed high tension line lies "dead" at certain times, repair, painting and other work near it may be best left until the line is "killed". Had the portion of the ventilator adjacent to the line been painted first, while the line was "dead" there might have been less likelihood that an unthinking man would repaint in the vicinity of the lines.

(4) No foreman should leave a workman in the vicinity of such a potential hazard, even momentarily, without transferring authority to another to watch and warn the worker.

(5) Although warnings to the victim are supposed to have been ample, the fact that he worked into deadly proximity to the "high line" would prove that they were not. Young and recently employed workers cannot be too frequently reminded where their safety, or, as in this case, life is at stake.

Even Low Voltage Dangerous

Remember that far less than 2300 volts can kill. Shocks from voltages as low as 110 have resulted fatally in the experience of many industries. Legal executions seldom use above 1500 to 2000 volts. A 2300-volt line is a deadly hazard.

If any of our readers are not sure that the high tension lines in their plants are not well out of reach of workers, we cannot plead too emphatically that they proceed at once with a thorough inspection of every line and every piece of electrical power and control apparatus.

If there is a line with which anyone except your electrician can come into contact in the course of his duties be sure that it is guarded immediately by barriers, placards, bulletins and individual verbal warnings. Then make arrangements to get it up out of the way just as quickly as possible. And as a general word of warning: Don't forget —reminders must be repeated almost constantly to young and new employes —no men are safe around industrial hazards until they become safety-minded and follow safe practices as a habit. Even such men should be warned and checked occasionally.

Becoming Safety-Minded

How long does it require for the average man to become safety-minded? There probably is no general answer. But in the cement industry 37% of the workers employed 10 years or less had 65% of the accidents in 1936. In contrast, the 44% of the total employed force which had worked from 10 years to 20 years had but 26% of the accidents and the 19% at work more than 20 years had but 9% of the accidents.

The victim of the accident described above had been employed 7 months. Employes with 7 months' experience in cement plants suffer about four times their proportionate share of plant accidents, according to figures provided by the Portland Cement Association; therefore such relatively inexperienced men are not to be trusted in especially dangerous situations except under constant supervision and watching.

New P. C. A. President

PORTLAND CEMENT ASSOCIATION, Chicago, Ill., has chosen Frank T. Sheets, president, effective September 1, succeeding Edward J. Melven, who resigned.

Mr. Sheets for the past four years has been consulting engineer and director of development of the association. Prior to that time he had been associated with the Illinois Highway Department for 23 years and for 12 years as superintendent of highways and chief engineer.

Coming out of high school Mr. Sheets started to work in the Department of Highways as blueprint boy and file clerk. He then took time off to go to college, working his way through, being employed by the State Highway Department during the summer in order to get additional revenue for his education. At the completion of his college course he entered the Highway Department and in successive civil service examinations became assistant engineer, assistant bridge engineer, assistant maintenance engineer, bridge engineer, engineer of design and finally the top position of superintendent of highways and chief engineer. His selection for this position was based solely on his outstanding ability and the success with which he handled his successive jobs.

Frank T. Sheets

Mr. Sheets has served as president of the American Association of State Highway Officials, of the Mississippi Valley Highway Conference, of the Central Illinois section of the American Society of Civil Engineers. He was an official delegate from the United States government to the Pan-American Highway Congress at Rio de Janeiro in 1929.

His experience in the highway field covers practically all phases of highway financing, design, construction, maintenance and administration. During the 12 years ending January 1, 1933, he directed expenditure of over $450,000,000 for highway and bridge construction and maintenance and supervised construction of approximately 11,600 miles of highways in the state of Illinois of which 8,356 miles were high type primary roads.

He is the author of "Concrete Road Design, Simplified and Correlated with Traffic" presenting sound and simplified methods of designing pavements to meet traffic expectancy. He has, during the past few years directed the administrative and technical policies of the highways bureau of the association, and has directed industrial research to develop new and improved uses of portland cement and concrete, in addition to performing his duties as consulting engineer.

The County Plant

"THE ST. CROIX COUNTY (Wisconsin) highway department is going into the gravel crushing racket in a big way," says the *New Richmond* (Wis.) *News*, which continues: "It must have cost scads and scads of money. Various estimates are made ranging from $30,000 up.

"Just when and where they advertised for bids for all this mighty expensive equipment, as we are advised the law requires, deponent knoweth not.

"About the operation there appears to be a needless amount of standing around and looking on and conversation and leaning on shovels, but that seems to be more or less prevalent on all jobs, local, county, state and national, done at public expense and not on contract.

"There also appears to be numerous familiar monikers in the roster of the crew, sons and sons-in-law and other relatives of men whose names we have heard before. But that seems to be a firmly established practice in our form of government. A Tammany politician summed it all up in a nutshell when he exclaimed: 'What in hell are we here for?'"

Group Insurance

CALAVERAS CEMENT CO., San Francisco, Calif., has adopted a group life insurance program for employes. Both office and plant employes with three months' or more service participate in amounts dependent on length of past and future service with the company.

Agricultural limestone storage bin

Acme Limestone Company Makes

CRUSHED STONE SAND

By Diligently Worked Out Process

By BROR NORDBERG

THE MANUFACTURE OF STONE SAND at the Acme Limestone Co. plant, Fort Spring, W. Va., came about from the desire of the company to find a market for large tonnages of limestone screenings passing the No. 4 mesh screen. Before starting this enterprise in 1930, screenings accumulated to the point where getting rid of them was a problem. In 1929, some 29,000 tons of this material were given away, while only an occasional few tons were sold at a price. It was felt that these finer stone sizes could be used to advantage, and, after considerable experimentation and research, the manufacture of stone sand was perfected on a practicable scale, but as a byproduct and not as a separate and distinct process.

This concern pioneered the stone sand industry in its marketing area and has perfected the gradings required, within reasonably close limits, to produce a fine aggregate for concrete which will give to such concrete satisfactory strength, good workability and a proper water-cement ratio.

After quite some research, it was decided that gradings of stone sand made from screenings by the dry method could be more closely controlled than when screened wet. Consequently, practically all stone sand manufactured at this plant is made by the dry process, although a small tonnage is made by the wet process in passing stone through the washing plant. This stone sand is entirely acceptable, but size gradations are more difficult to control.

Consults Experts

Before beginning the manufacture of stone sand on a commercial scale, a report was obtained from a well-known commercial testing laboratory substantiating the claim that such stone sand when used as fine aggregate would make good concrete. This was done, and a 30,000-ton order followed, where the sand made was used in the construction of a large railroad tunnel. Since then, this stone sand has been used satisfactorily in practically every type of concrete construction.

Before describing the manufacturing process, it is pointed out that no attempt has been made to make sand of itself, but that sand is being manufactured as an adjunct to other gradings of stone and as an attempt to reap some profit from hitherto wasted fines.

Consequently the plant output of stone sand varies tremendously and is dependent upon the sizes of commercial stone being run at any selected time in the plant. The larger the stone being run, the less stone sand will necessarily be made, and when the demand is for small stone sizes and a number of variations in these gradings, more fines are being created and the output of stone sand reaches a maximum.

Whys and Wherefors

The regular plant processes all have part in the manufacture of stone sand, the setting of each and every plant crusher being instrumental in creating the screenings from which sand is made; the finer the crusher setting, the higher the output of sand sizes.

Since starting sand manufacture, the demand for more and more stone of small sizes has developed, such stone being used for road surfacing, etc., and more and more screenings have resulted. Having a stone sand plant in operation has greatly simplified the production of these smaller stone sizes.

The plant is strategically located, in

General view of Acme Limestone Co. plant

the mountains, far from sources of natural sand, and the ability to furnish stone sand often makes possible the sale of the larger stone to a customer, where the business would otherwise go to a roadside plant. Regardless of the tonnage of sand produced, the practice of "giving away" undesirable screenings no longer exists and every ton of stone going through the plant brings a price. In anticipation of large orders, a reserve of 5000 to 7000 tons of sand is kept in open storage, but no attempt is ever made to deliberately produce the sand at the expense of commercial crushed stone.

Most of the sand produced is made to meet the West Virginia state highway specification, with minor variations

Air separator is important part of process

LEFT—Horizontal screen for making stone sand. RIGHT—Crusher used in connection with stone sand operation

in grading for other specifications. The West Virginia specification is as follows:

Passing ⅜-in. sieve	100%
Passing No. 4 sieve	95-100%
Passing No. 10 sieve	75-95%
Passing No. 20 sieve	35-75%
Passing No. 50 sieve	5-25%
Passing No. 100 sieve	0-5%

Wet Processing

The manufacture of stone sand begins at the primary crusher, where the fracture of rock first occurs and some screenings are produced, the amount being dependent upon the sizes of stone being made (the crusher opening) and the crusher characteristics.

At this plant, rock is hauled from the quarry in 4-yd. Western side-dump cars by 18-ton locomotives and discharged to a 36-x48-in. Allis-Chalmers jaw crusher. From the crusher, rock is carried over a 30-in. belt conveyor, 75 ft. centers, to an Allis-Chalmers 60-in. by 20-ft. revolving scalping screen, where 2½-in. and smaller sizes are separated out for passage through the washing plant.

In the washing plant, some fines (below No. 4 mesh) and spalls are screened out through a 48-in. by 24-ft. Allis-Chalmers revolving screen with a 4-ft. sand section. The throughs (minus No. 4) are passed over a Universal, 3-x8-ft., single-deck, vibrating screen with 8-mesh cloth on the upper end and 5 mesh on the lower end. On the screen, a certain percentage of the material between No. 4 and No. 5 is bypassed by limiting the surface over which the product passes, and similarly some of the No. 8 to No. 5 size is taken out as desired.

Two reduction crushers

The fractions of No. 5 to No. 8 and No. 4 to No. 5 sizes not "side-tracked" pass to an Allis-Chalmers twin screw washer along with all the minus No. 8 stone. Here, some of the No. 100 fines wash out and the graded material goes to a wet bin. This is the wet process sand, making up a small percentage of the total sand produced. It is made to use every possible ton of stone passing through the plant.

Dry Processing

Returning to the rotary scalping screen, plus 2½-in. stone passes over a grizzley with 8-in. openings, with the oversize passing to a 7½ Austin gyratory crusher and the throughs going to a 10-in. Allis-Chalmers Newhouse crusher. Here again, the setting of these crushers determines largely how much screenings will be produced and consequently how much sand can be made.

The throughs from both crushers are carried over an Allis-Chalmers 85-ft. bucket elevator to a Niagara double-deck vibrating screen, usually with 2½-in. openings on the top deck and 1½-in. bottom-deck openings. The rejects may be placed directly in reserve bins or returned for further reduction to a 10-in. Newhouse crusher or to two 7-in. Newhouse crushers and again passed over the screen. The 1½ to 2½-in. stone is railroad ballast and goes to storage. Sometimes part of this product is used as concrete stone. If the demand on the plant is largely for smaller sizes, some of this product may be placed in surge bins as feed for the reduction crushers.

Minus 1½-in. stone is passed over a Niagara, double-deck, 4-x8-ft. vibrating screen with 1-in. top-deck openings and ½ or ¾-in. openings on the bottom-deck, dependent on the stone sizes required. The 1 to 1½-in. stone and the ½ or ¾ to 1-in. stone can either go to shipping bins or surge bins. The ½ or ¾-in. minus throughs are passed over another Niagara, 4-x8-ft., double-deck screen with ⅜-in. and No. 4 openings on the top and bottom decks respectively. Plus ⅜-in. and No. 4 to ⅜-in. stone go to loading bins, while minus No. 4 stone drops to a Symons 3-x8-ft. double-deck horizontal vibrating screen to be graded for stone sand.

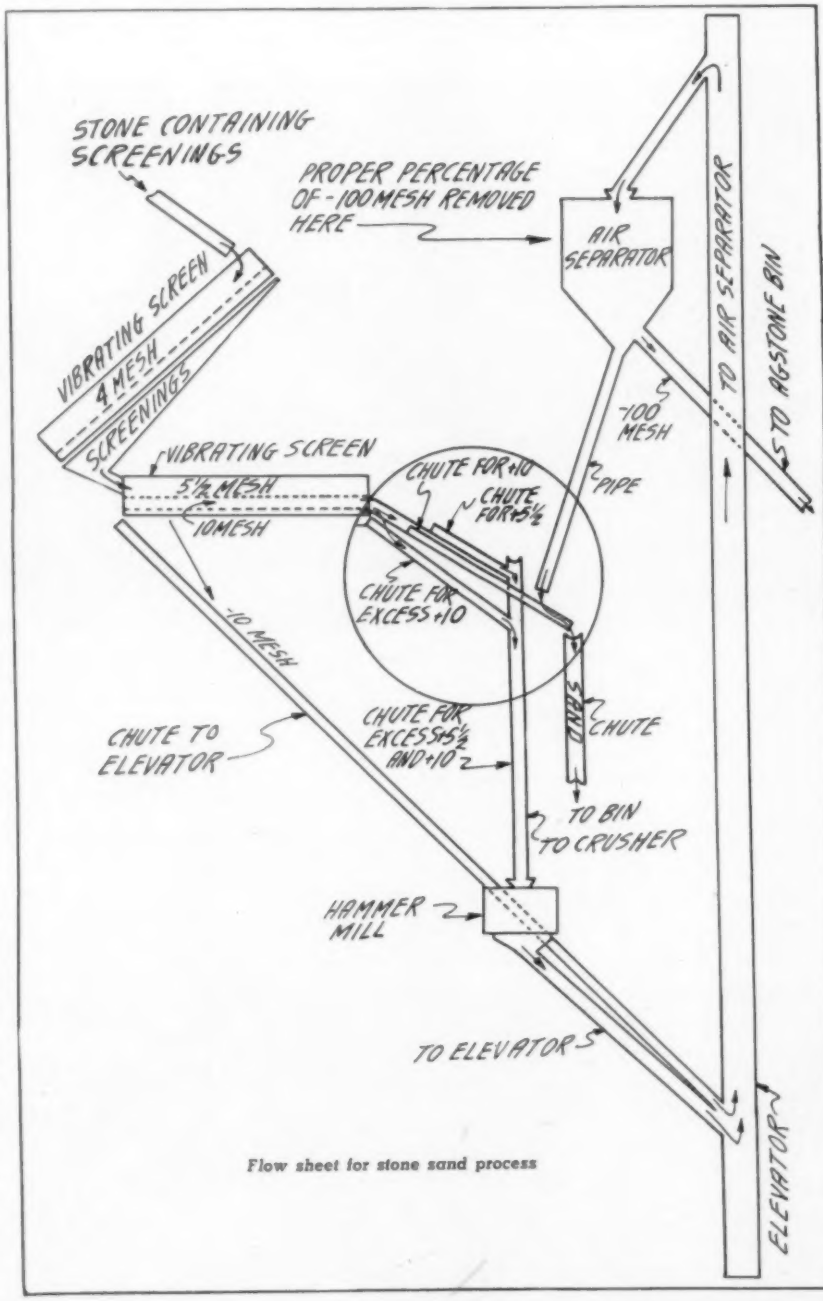
The first 6 ft. of the top deck has 8-mesh openings and the other two feet 5½-mesh openings. The bottom-deck has 10-mesh openings with a drop on the discharge end to permit passage of minus 5½-mesh stone without passing over the lower deck.

From the top deck, the No. 5½ to 4 stone can go to the sand bin or, as is generally done, most of it is diverted in the chute by a gate, to be used for Amiesite asphaltic road surfacing. This diverted stone may also be chuted to a 36-in. Jeffrey hammer mill. The No. 5½ to 8 stone usually all goes into the grading of stone sand, although occasionally a small percentage is diverted to the hammer mill to be made into agricultural stone. The stone sand bin has 60 tons capacity, and when full sand is conveyed to outside storage. Similarly, the No. 8 to 10 stone usually all goes into sand but any excess can be passed to the hammer mill for making agricultural limestone.

Minus 10-mesh stone is chuted to the boot of a Jeffrey chain bucket elevator of 15-ton hourly capacity and passed through a Sturtevant 8-ft. separator, set to remove the desired percentage of 100-mesh and finer. While 0 to 5% passing the 100-mesh is allowed, these fines usually are held to 3 or 4%.

The dust (minus 100) separated out is stored as agricultural limestone. Since the manufacture of stone sand was begun, agricultural limestone has grown more and more important, and at times all the minus No. 4 stone from the Symons screen is put through the hammer mill with a 1/10-in. bar spacing and converted direct into agricultural limestone.

This is not the regular practice however. The rejects from the separator, when agricultural limestone is not being run heavily and only is being made incidental to the manufacture of stone



Flow sheet for stone sand process

sand, are dropped back by chute to the discharge end of the Symons screen box to be blended intimately with the three sizes coming from the screen. The ultimate product, from this point, may either go to the sand bin or stockpile.

Needless to say, certain variables affect the gradation and ultimate quality of the final product. Certain percentages of each fine size screened out are necessary to make a specification stone sand and these sizes must needs be blended in the chutes or screen discharge box before passing to the sand storage. A gate in each chute that carries a small stone size from the Symons screen can be set to divert any proportion of this size, leaving the remainder to pass on and be blended for sand.

As the demand for stone sizes changes, crusher settings are varied and the sizes and quantity of limestone screenings created also vary. This calls for changes in the chute control gates, as more or less of any one fine size from the Symons screen also varies. These chutes are set manually, and the amount of change is determined by gradation tests run frequently in the laboratory. These tests are of particular importance when crusher settings are changed, but are also run often whether such changes are being made or not.

The separator setting is changed when rock wet from rains is being processed. Much of the fines necessarily would adhere to the No. 4 screen wire. The separator at such a time would be set to take out, say, the 90-mesh dust.

The stone sand made in the wet plant, while meeting specifications, is deficient in 100-mesh stone. It is trucked from its bin and placed in the same open storage with the dry process sand, and in the process of loading is blended.

JUNE SAFETY CAMPAIGN SUCCESSFUL

Accident Rate Reduced 50%

THE NO-ACCIDENT CAMPAIGN conducted during June in the cement mills of the United States and Canada by the Portland Cement Association came to an end at midnight on June 30 with practically all of the industry's previous safety records smashed.

The gross accident total for June, 1937, was cut to 50% of the 1936 total, although more man-hours were worked and probably more cement was manufactured.

The accident frequency rate for the month was cut to 4 accidents per million man-hours worked, 56% of the rate for *the entire year of 1936;* the actual rate for *June, 1936,* has not been computed but was still higher.

Accidents suffered in the cement plants during June, 1937, only amounted to one mishap for every 250,000 man-hours worked, which would be equivalent to one mishap for every 31,250 8-hour days, or 6,250 40-hour weeks, or 156 40-week years worked in the operating departments of the industry. This number amounts to about one accident for every 2,000 men on the operating payroll.

135 Plants Accident-Free

Of the 150 plants coöperating in the month's campaign, 3 suffered 2 accidents each, 14 had one accident each and 135 completed the month accident-free.

From the viewpoint of saving of human life, safeguarding of income and sparing of unnecessary pain and impairment of future, the campaign was a great success. It was an even greater success from another standpoint. The records achieved during June prove beyond doubt that the unfavorable accident trend in the cement industry, which has given so much concern during the last 30 months, is now definitely reversed. Preliminary figures by the Portland Cement Association for the first half of July provide further definite confirmation of this fact.

The June campaign was also a great success in reduction of waste expense to the industry. The Portland Cement Association reports that its June campaign was more extensive than any in the past. Interest now centers on how long the concentrated campaign work of June will continue to reflect results.

June Accidents

Next in interest to the fact that the campaign was successful are the cases in which accidents were suffered in spite of the thorough preparations and training made with the object of completing the month as nearly accident-free as possible. It is regrettable, of course, that there were any mishaps.

Geographical distribution of accidents: Illinois, 3; Iowa, 1; Michigan, 2; Ohio, 1; Oklahoma, 1; Oregon, 1; Pennsylvania, 3; Texas, 1; Washington, 1; Canada, 2.

Departmental distribution: Quarry, 4; Finish Mill, 4; Packing and Shipping, 4; Raw Mill, 2; Burning, 1; Coal Grinding, 1, and Electrical, 1; all other departments, 0.

Condensed Description of Accidents

1. A quarryman was caught in a small rock slide causing a badly bruised ankle. Age, 22, period of service 2 years.
2. Laborer digging earth from bank to make a fill was caught in a slide which pinned his legs, fracturing bones of left foot. Age 21, period of service 2 weeks.
3. Quarryman backing truck out of garage backed into parked tractor squeezing powderman between dump box of truck and tractor radiator, breaking one rib and bruising back and elbow. Injured was 54 years of age.
4. Attempting to replace jack stick in rack while train was in motion brakeman crushed fingers of left hand requiring amputation of index finger. Age 33, length of service 15 years.
5. As locomotive crane operator was sanding track in front of his crane, boom dropped and bucket fell upon him. His injuries included extensive laceration of the scalp, severe contusions of the entire back, multiple fractures of spine and pelvis, and multiple abrasions. Age 36 years, length of service 3 years.
6. Suspecting trouble, electrician pulled main switch without investigating to see whether motor was running or if oil switch lever was in off position. Heavy switch box exploded causing burns on face, right hand and arm, left arm, chest and shoulder. Age 37 years, length of service 14 years.
7. Laborer in kiln stack dust chamber received several bad burns when dust pile exploded as bar was being driven through caked exterior of pile. Age 57, length of service 6 years.
8. As conveyor box was being lowered to floor by three men, injured's leg was caught between box and shafting, bruising leg. Injured's age is 28, length of service 3 years.
9. Miller slipped on steps, causing an abrasion of an old healed varicose ulcer on skin of left leg. Age 64, length of service 37 years.
10. Scaffolding on which he was working gave way, allowing boilermaker to fall to floor. Descent was broken by roof sheeting, timbers and pipe. Left leg broken. Injured is 42 years of age, length of service 10 years.
11. Carpenter stepping into conveyor spout, threw latter out of balance, allowing him to fall against wall of building, striking head and receiving concussion of brain. Length of service 14 years.
12. In attempting to prevent pipe from falling when cribbing on which it was supported slipped, repairman caught fingers of right hand between pipe flange and concrete. Three fingers were severed. Injured is 41 years of age, length of service 23 years.
13. While manipulating switch, short circuit occurred, causing arc. Injured was a bulk cement loader, 39 years old, who had been employed 18 months. Hands and face burned.
14. While putting away car puller rope, a car cleaner, age 52, period of service 18 years, was injured when the rope caught and was wound around nigger head, chain on end of rope striking him, fracturing left leg.
15. Tier of bags in car fell and hit packer, fracturing both bones in right leg. Length of service 11 years.
16. Worker's foot slipped into screw conveyor, being bruised by lid. Age 18 years, length of service 8 months.
17. Preparatory to repairing Cottrell precipitator apparatus, electrician removed "ground" connection unnecessarily and was electrocuted when he seized charged frame.

Chemists' Corner

A Modified Ethylene-Glycol Method for

Determination of Free Lime in Cement Clinker

S. RORDAM,

Director of Central Research Laboratory, Cowham System Plants, care of Trinity Portland Cement Co., Houston, Texas

THE AUTOCLAVE TEST for soundness of cement has emphasized the necessity of keeping a close check on the amount of free lime in the fresh clinker.

The Alcohol-Glycerol method for the determination of free lime in cement as developed by Emley and by Lerch and Bogue (1) is accurate, but it requires too much time for the completion of an analysis to qualify it as a quick and simple control test.

The use of an addition of Barium Chloride as an accelerating agent as proposed by Brandenburg (2) reduces the time required for the completion of the test, but it still leaves too long a testing period, and it still calls for a series of titrations to determine the end-point.

Schlaepfer and Bukowski (3) have developed a method using Ethylene-Glycol as the lime solvent, followed by a single titration.

The method is considerably quicker than the alcohol-glycerol method, and it will give reliable determinations of free lime in fresh clinker.

It will give too high results when used on a material containing hydrated cement.

The Schlaepfer and Bukowski method requires that the flask containing the finely ground clinker sample and 40 c. c. ethylene-glycol is shaken in a constant-temperature water bath (65 deg. C.) for 30 minutes.

The liquid is then filtered on a suction filter and washed with alcohol. The filtrate is titrated with N/10 HCl, using a special indicator consisting of a mixture of Phenolphtalein and a-Naphtolphtalein.

This method has been investigated in our Central Research Laboratory and has been found to give good results. But the special indicator recommended is not considered satisfactory, and the necessity of having a special shaking apparatus makes the test somewhat complicated.

A modified ethylene-glycol method has been developed in our C.R.L. This method appears to give reliable determinations of free lime in clinker, with the utmost simplicity of analytical operations.

As a check on the results obtained by this method a series of comparative tests have been carried out in coöperation with our seven plant laboratories.

TABLE 1—CHEMICAL COMPOSITION OF CLINKER SAMPLES USED FOR COMPARATIVE TESTS

The analyses given are averages for clinker produced at the plants supplying the samples.

The actual analyses of the individual samples tested for free lime may be slightly different, but the analyses given below will give a clear picture of the three different types of clinker used for the tests.

Series 34: Low magnesia, high C_3A plus C_4AF

Series 35: Medium magnesia, medium C_3A plus C_4AF

Series 36: High magnesia, medium C_3A plus C_4AF

	Series 34	Series 35	Series 36
SiO_2	20.4%	22.5%	22.5%
Al_2O_3	7.3	5.8	5.7
Fe_2O_3	4.0	2.6	2.6
CaO	65.9	66.1	64.5
MgO	1.0	2.6	4.5
SO_3	0.4		
C_3A	12.6%	11.0%	10.4%
C_4AF	12.2%	7.9%	7.9%

Nine clinker samples were prepared and distributed to the plant laboratories. Each laboratory made determinations of free lime in the samples using their regular analytical methods. All plant laboratories have used the Alcohol-Glycerol method. Some laboratories have been using Methyl Alcohol others Ethyl Alcohol. The determinations have been made with and without the addition of Barium Chloride as an accelerator.

Similar determinations of free lime were made in our Central Research Laboratory using the modified Ethylene-Glycol method only.

The results of the comparative tests are listed in Table 2.

A detailed record of individual free lime determinations obtained by the C.R.L. method is given in Table 3.

In Table 4 is given a record of the time required to complete the determinations in the various laboratories.

The agreement between the tests made in the different laboratories is on the whole very good, especially when it is considered that a test of this nature is bound to show some variations on account of the very small amount of titrating solution required for some of the determinations.

TABLE 2—COMPARATIVE DETERMINATIONS OF FREE LIME IN CLINKER SAMPLES

Laboratory	Type of alcohol used	Was $BACl_2$ used	34-1	34-2	34-3	35-1	35-2	35-3	36-1	36-2	36-3
1	Methyl	No	—	0.79	—	—	—	—	—	—	—
	Methyl	Yes	1.94	0.76	0.41	0.59	1.17	1.24	0.14	1.14	3.17
2	Methyl	Yes	1.64	0.91	0.47	0.69	1.23	1.26	Trace	1.11	3.16
3	Ethyl	No	1.87	0.42	Trace*	Trace*	1.18	0.82	Trace	1.15	3.15
4	Ethyl	No	1.92	0.71	0.19	0.71	1.03	0.96	Trace	0.58	3.27
5	Ethyl	No	1.79	0.93	0.44	0.77	1.30	1.31	0.22	1.27	3.07
	Ethyl	Yes	1.94	0.99	0.42	0.72	1.33	1.33	0.19	1.26	3.26
6	Ethyl	Yes	2.07	1.01	0.45	0.85	1.35	1.38	0.18	1.31	3.50
7	Ethyl	No	1.52	—	—	0.54	—	—	Trace	—	3.36
	Ethyl	Yes	1.80	0.90	0.45	0.81	1.32	1.40	0.21	1.36	3.49
Highest			2.07	1.01	0.47	0.85	1.35	1.40	0.22	1.36	3.49
Lowest			1.52	0.42	0.00	0.00	1.03	0.82	0.00	0.58	3.07
Average			1.83	0.84	0.40	0.71	1.24	1.21	0.12	1.15	3.26
Central Research Laboratory Modified Ethylene-Glycol Method			1.80	0.82	0.46	0.73	1.32	1.30	0.29	1.32	3.63

* These two determinations have not been included in the average.

There is a very good agreement between the averages of all determinations made at the plant laboratories and the results obtained by using the C.R.L. method.

Judging by the results of these comparative tests we are of the opinion that it in most cases will be found advantageous and time saving to use the C.R.L. Ethylene-Glycol method for the daily control tests of free lime in the clinker.

Description of C.R.L. Method

One gram finely ground clinker is placed in a 200 c.c. flask together with a pinch of dry Ottawa sand. To this is added 30 c.c. ethylene-glycol and 15 c.c. absolute methyl alcohol.

The flask is shaken so as to bring the cement in suspension. It is then placed on a hot-plate under an air-cooled reflux condenser as used for the Alcohol-Glycerol method.

The actual boiling is continued for 30 minutes. A medium-heat hot-plate or a steam bath will serve equally well.

The methyl alcohol in the flask acts as a temperature regulator. It will keep the temperature of the boiling liquid at 82 to 84 deg. C. It also helps to expel the air from the flask, thus preventing a too rapid oxydation of the glycol.

The filtration is also facilitated by the addition of alcohol.

After boiling for 30 minutes, with an occasional shaking to keep the cement in suspension, the flask is removed from the hot-plate and the contents are filtered on a suction filter as shown on Fig. 1.

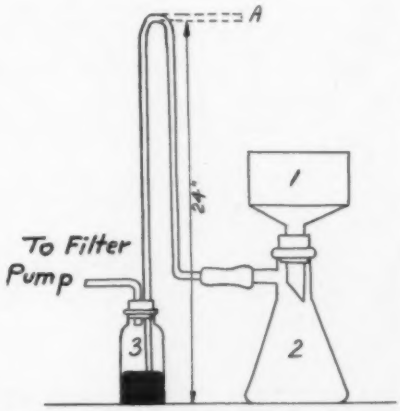


Fig. 1 (1) Buchner funnel Size 0
(2) Filtering flask, 250 c.c.
(3) 60 c.c. wide mouth bottle with about 20 c.c. mercury

The filtering flask can be connected at A, or the whole mercury valve can be placed at some convenient place with a tube connection to the filtering flask.

A 55 m.m. filter is convenient for use in the Size 0 Buchner funnel. The inside diameter of this funnel is 41 m.m. Fold filter paper over a cork having a diameter of about 38 m.m. to ensure an even edging of the paper when placed in funnel. Munktell No. 1F has given good service.

Do not let the liquid overflow the edge of the filter paper.

The flask is washed twice with 10 c.c. alcohol, and the filter is washed a third time with 10 c.c. alcohol poured down around the edges of the filter.

To the filtrate in the filtering flask, which should be quite clear, is added about ten drops Bromothymol Blue indicator, and the solution is titrated with N/10 HCl.

The titration is carried out by adding excess HCl until clear yellow color. The excess acid is titrated back with N/10 NaOH until a blue-green color. This blue-green color is about one drop NaOH removed from the clear blue alkaline color range.

This method of titration will give a sharp end-point which can be rechecked as often as desired.

If acid only is used for the titration it will be found that it is not easy to arrive at a definite end-point. When the titration is nearing the end-point it will be found that the addition of one drop of acid will give an almost yellow color which then changes back to a green color. This color change will take place several times.

This may be due to sluggish hydrolizing of the lime-glycolate, and it may also be due to the formation of a small amount of $CaCO_3$ due to absorption of CO_2.

By using the excess acid titration followed by a back titration with NaOH this uncertainty is eliminated.

TABLE 3—FREE LIME DETERMINATIONS IN CLINKER SAMPLES
Record of Individual Tests. Central Research Laboratory Ethylene-Glycol Method.

	34-1	34-2	34-3	35-1	35-2	35-3	36-1	36-2	36-3
					1.22	1.26			
Using Eastman	1.70	0.72	0.32	0.60	1.32	1.35	No determinations		
Ethylene-Glycol	1.82	0.76	0.32	0.69	1.26	1.26	made with Eastman		
					1.24	1.28	Ethylene-Glycol		
Eastman Eth.-Glyc. Average	1.77	0.74	0.32	0.65	1.26	1.29	—	—	—
Using Technical	1.84	0.87	0.61	0.78	1.45	1.31	0.36	1.34	3.64
Ethylene-Glycol		0.94	0.57	0.79	1.29	1.31	—	1.21	3.62
			0.50	0.79	1.27	1.32	0.22	1.32	3.57
					1.31	1.32	0.22	1.32	3.62
							0.32	1.39	3.63
							0.31	1.36	3.69
Tech. Eth.-Glyc. Average	1.84	0.91	0.56	0.79	1.34	1.32	0.29	1.32	3.63
Grand Average	1.80%	0.82%	0.46%	0.73%	1.32%	1.30%	0.29%	1.32%	3.63%
Highest	1.84	0.94	0.61	0.79	1.45	1.35	0.36	1.39	3.69
Lowest	1.70	0.72	0.32	0.60	1.22	1.26	0.22	1.21	3.57

The above results are compiled from tests made by three different analysts.

TABLE 4—TIME REQUIRED FOR THE COMPLETION OF THE FREE LIME TESTS IN THE INDIVIDUAL PLANT LABORATORIES
Clinker Samples No.

Laboratory	$BaCl_2$ used	34-1	34-2	34-3	35-1	35-2	35-3	36-1	36-2	36-3
1	No		5:00							
	Yes	3:05	2:35	2:15	2:30	2:50	2:50			
2	Yes	0:55	0:55	0:45	0:45	1:20	1:20	0:15	0:50	0:55
3	No	6:00	5:00	1:00	1:00	3:40	5:40	1:00	6:40	4.00
4	No	3:15	3:00	3:00	3:30	5:30	5:30	2:00	7:00	4:30
5	No	5 to 6 hours when no $BaCl_2$ is used								
	Yes	1:40 to 2:00 when $BaCl_2$ is used								
6	Yes	Average time required is estimated as being 1 hour 56 minutes								
7	No	5:00			4:00			3:00		5:00
	Yes	0:40	0:40	0:30	0:40	0:45	0:60	0:45	0:60	0:75

The completion of a free lime test according to the C.R.L. Method takes 40 min. (30 min. boiling, 10 min. other operations). The timing is the same for all samples.

Reagents Required

Ethylene-glycol must be pure, neutral and free from water.

The neutrality should be tested by adding one drop N/10 NaOH to 30 c.c. glycol to which indicator has been added. This should give a clear blue color.

A slight acid reaction is not absolutely objectionable as it will be allowed for by the standardizing of the N/10 HCl in combination with the glycol.

We have tested some three to four different samples of ethylene-glycol and have found them to be quite neutral.

Ethylene-glycol is very hygroscopic and must be kept in well stoppered bottles. It is advisable to have not more than about 500 c.c. in the bottle which is in daily use. If desired this bottle can be kept in a suitable container over calcium chloride.

As far as we know the Carbide & Carbon Chemical Corp., 30 East 42nd St., New York City, is one of the few manufacturers of ethylene-glycol.

It manufactures only a technical grade, but we have found it quite satisfactory.

The Eastman Chemical Co. can supply a refined grade of ethylene-glycol. We have not found any advantage in

using the refined glycol in preference to a good technical grade glycol.

The specific gravity of the ethylene-glycol should be not less than 1.109 at 20 deg. C.

Methyl alcohol that we have been using is supplied by the Du Pont plant at Belle, W. Va.—Du Pont synthetic methanol, 99.85% pure.

Indicator: 0.1 grm. bromothymol blue in 100 c.c. alcohol.

N/10 HCl: About 30 c.c. strong HCl in 3500 c.c. water.

In standardizing the acid it is important to follow the old rule that in standardizing a volumetric solution one should follow the analytical procedure as nearly as possible. By doing this, it is as a rule possible to compensate some of the otherwise unavoidable analytical errors.

The ethylene-glycol may vary a little from batch to batch, it will contain varying amounts of CO_2 dissolved. In filtering the ethylene-glycol it is almost impossible to avoid a slight carbonation of the lime contained in the solution, part of which will be retained by the filter.

To compensate for these sources of errors the acid should be standardized in the same manner as the actual analysis is carried out.

Standardizing

Convert about 2 grm. pure $CaCO_3$ to calcium oxalate, filter, wash and ignite in a platinum crucible to constant weight.

Then grind the CaO in the crucible with a glass rod so as to break up all lumps and larger crystals.

Ignite again at medium heat about ten minutes.

Cool and let the crucible with a well fitting cover stand for some minutes in the balance until it reaches constant weight.

Place about 0.1 to 0.2 grm. CaO in a dry 200 c.c. flask and reweigh the crucible to get the exact amount of CaO.

Moisten the CaO in the flask with a few c.c. freshly boiled water and heat for a few seconds to hydrate all lime. Then add 30 c.c. ethylene-glycol and 15 c.c. alcohol. Boil under reflux condenser until all lime is dissolved.

If some little lumps remain after about fifteen minutes boiling they should be broken up with a glass rod.

If the lime is not too coarse it will have dissolved after about 30 to 45 minutes boiling.

The liquid may be slightly milky due to the formation of a small amount of $CaCO_3$ caused by CO_2 contained in the glycol.

	Ethylene-Glycol, C.R.L. Method	Alcohol-Glycerol, Method	Ethylene-Glycol, 15 min. boil	1.0 Grm $BaCl_2$ 30 min. boil
Sample *A*	0.26% CaO	0.21% CaO	0.40%	0.52%
Sample *B*	0.30%	0.20%	0.50%	1.57%
Sample *C*	1.39%	1.28%	1.67%	2.28%

Filter and wash with alcohol as in the analysis.

Add indicator and titrate with excess acid and back to neutral with NaOH.

It is advisable to repeat the standardization several times as the individual determinations may not check quite as closely as a straight forward standardizing against $CaCO_3$.

The acid can be standardized against $CaCO_3$, but it will be found that the free lime determinations are likely to be about 0.2% low.

This is not a serious error when it is a question of more or less relative routine check values.

General Discussion of Method

Ethylene-glycol oxydizes slowly during boiling. The oxydation during one hour's boiling does not develop sufficient acid compounds to cause any noticeable error in the results.

Blank test: 30 c.c. glycol, 15 c.c. alcohol, indicator and one drop N/10 NaOH (clear blue color)

Boiling Time	*Temperature*	*Color*
20 Min.	83 deg. C.	Deep blue-green
30 Min.	83 deg. C.	Green
60 Min.	84 deg. C.	Yellow - green, the addition of one drop NaOH gave blue color

CaO dissolved by ethylene-glycol: 20 c.c. glycol and 10 c.c. alcohol boiled with excess CaO for thirty minutes. Filtered and titrated with HCl.

20 c.c. glycol had dissolved 0.39 grm. CaO.

As 1.0 grm. clinker having 1.0% free lime contains only 0.01 grm. free CaO this test would indicate that less than 30 c.c. ethylene-glycol would be sufficient for an analysis.

Tests we have made prove that not less than 30 c.c. glycol is required to ensure complete reaction in 30 minutes.

Effect of an addition of barium chloride: An addition of $BaCl_2$ to the analysis will cause high results, even when the boiling time is reduced to about 15 minutes.

Suction Filtration

The ordinary type water suction pump will give excellent service unless the water line pressure is on the low side.

In such a case it may be found necessary to use a small motor driven suction pump.

When a water suction pump is used it is very advisable to insert a mercury valve between the pump and the filtration flask.

A drop in the line pressure may otherwise result in a wasted analysis as tap water will be drawn into an unprotected filtration flask.

The sketch of the arrangement of the suction filter is purely schematic. It is desirable to have an intermediate suction flask between the mercury valve and the filtration flask. This intermediate flask should have a valve for taking the suction of the system when the filtration is completed. A simple T-tube connection can also be used.

An ordinary type funnel and a 9 cm. hardened filter (Schleicher & Schull, No. 575) can be used, but it is likely to be somewhat slower working than the Buchner funnel. We have found the Buchner funnel simpler to use than a special sintered-glass filter as the cleaning is so much easier.

In placing the filter in the Buchner funnel it is easiest to do it with the suction turned on. Place the filter in the correct position and moisten it with a little alcohol. Then press the edges of the filter to the sides of the funnel so as to get a good tight fit. The filtration is very rapid when the filter is well placed.

References:

(1) P.C.A. Fellowship, Paper No. 23. William Lerch and R. H. Bogue. "Revised Procedure for the Determination of Uncombined Lime in Portland Cement."

(2) Brandenburg, H. R., "A Tentative Method for Determination of Free Lime," ROCK PRODUCTS, 1931, 34(6).

(3) The Ethylene-Glycol Method developed by Schlaepfer and Bukowski is described by G. E. Bessy, "Free Lime in Cement," The Ethylene-Glycol and Glycerol Method. **Cement & Cement Manufacture, (London) August, 1936.**

Company Union

UNIVERSAL ATLAS CEMENT CO., Leeds, Ala., plant employes after three weeks of study and after hearing expert organizers, declined to become a unit of the C. I. O. and perfected an organization of their own. It is reported that while some of the employes were interested in the C. I. O. plan for a while, over 192 employes decided upon the formation of a local organization which will seek affiliation with a similar organization of employes of the Tennessee Coal, Iron & Railroad Co. (also a subsidiary of the United States Steel Corp.). No employe with power to employ or discharge is eligible for membership in the organization.

Abandons Company Pension

VERMONT MARBLE Co., Proctor, Vt., has decided to abandon a company pension plan put into effect in 1932, under which the company and the employes contributed 50-50 to a retirement fund. The plan was abandoned because of the federal social security act. During the past year 177 company employes have retired, either under the insurance pension plan or company's voluntary pension plan. Under the latter arrangement, payments aggregated $52,865 and were shared by 150 men. The other 27 men are receiving monthly checks under the insurance plan. There are 450 employes now sharing the insurance retirement plan. Last year they contributed $18,826 and the company's share was $19,062. Under another plan, providing sickness and disability benefits, there are 1147 employes participating. Last year there were 95 claims for disability and benefits totalling $6146.50 were paid the men for 3718 days of disability.

A. F. of L. Wins

SOUTHWESTERN PORTLAND CEMENT Co., Victorville, Calif., plant employes defeated an attempt of C. I. O. organizers to unionize them, 194 to 94, and decided to apply for reinstatement of an A. F. of L. charter they had allowed to lapse.

Rock Asphalt

BARNDOLLAR - CROSBIE ROCK ASPHALT PRODUCING Co., Ada, Okla., began operation of its new plant a mile and a half west of Ada, late in June. The plant is new, but the deposit was opened several years ago by the former Ada Asphalt Co.

Wage Increase

LEHIGH PORTLAND CEMENT Co., Metaline Falls, Wash., plant is reported to have granted a 5c per hour wage increase July 1. In addition employes of a year's or more service were granted a week's vacation with 40-hours pay.

Silicosis Risks Reduced

CALIFORNIA surcharges on compensation rates covering the dust-disease hazards which have been in force for the past year, have been cut 75% effective June 1. Insurance Commissioner Samuel L. Carpenter Jr., while stating that he believes this cut is too great, has approved the request of the California Inspection Rating Bureau. Among other changes is the elimination of cement manufacturing from the list and modification of the rules on clay products, lime and cement quarries. The new procedure also provides that all risks regardless of size, are included. Last year only those producing payrolls of more than $10,000 were included. It is also permissible now to rate plants individually, giving credits where the hazard has been placed under control and debits where plants have failed to reduce the hazards.

More Rock Asphalt Found

AMERICAN ASPHALTIC ROCK Co., OHIO ROCK ASPHALT Co. and OHIO ASPHALTIC LIMESTONE Co. are now operating quarries and crushing plants in a deposit of asphaltic limestone found a few years ago in Highland County, Ohio, between Vienna and Hillsboro. The asphalt impregnated limestone occurs on top of other limestone and is sometimes 15 ft. thick. Much of the product is trucked to nearby road jobs.

Again in Production

WABASH PORTLAND CEMENT Co., Stroh, Ind., plant resumed production late in June after several years' inactivity. Glenn Hall is superintendent.

New Owner

MAHONING VALLEY SAND Co., West Pittsburgh, Penn., bought at public auction, June 29, the property of the bankrupt Universal Sand Co., New Castle, Penn.

Signs with Union

UTICA HYDRAULIC CEMENT Co., Utica, Ill., is reported to have signed a closed-shop contract, with checkoff, with the United Cement Workers' Union (A.F. of L.). Wages in the plant were increased 5% and in the quarry 7%, with time and a half for over 8 hours a day.

How City Divides Business

INDIANAPOLIS, IND., Board of Works and Sanitation, says it has a method of prorating its cement business, where, as is usual, all bids are the same. The board claims to have made allotments (through pressure on contractors who do the actual buying) as follows: Lone Star Cement Co., Greencastle, 45 percent of the year's supply; Lehigh Cement Co., Mitchell, 25 percent; Universal Cement Co., Buffington, 20 percent, and Louisville Cement Co., Speed, 10 percent. This was arrived at by relative distances of the plants from the city and the amount of products bought in Indianapolis by the companies. The board did not include the Wabash and Kosmos companies in the ratio because their plants are outside the state.

The board of public works uses about 30,000 bbl. of cement a year and the price is $2.15 per bbl.

Company Union

YOSEMITE PORTLAND CEMENT Co., Merced, Calif., employes have formed a union to be known as Yosemite Employes Mutual Organization. Its constitution states it is to be the sole bargaining agency.

Discarded

STANDARD SILICA Co., Ottawa, Ill., recently junked the city's first silica sand plant—one built about 40 years ago for the former United States Silica Co.

To Build Putty Plant

PENNSYLVANIA SUPPLY Co., Harrisburg, Penn., will build a standard 2-tank Brooks-Taylor process lime putty plant for ready-mixed mortar service.

Mica Grinding

CHARLES BRADLEY, Franklin, N. C., is building a mill to grind mica.

Black Top

MIDDLE STATES BITUMINOUS CORP., Ironton, Ohio, has completed a blacktop plant on property owned by the Superior Cement Corp.

Gets Federal Contract

SOUTH DAKOTA STATE CEMENT, Rapid City, S. D., was low bidder on 43,000 bbl. of portland cement for the Hart Mountain reclamation project near Cody, Wyo., and 4000 bbl. for the Belle Fourche project at Newell, S. D. The price bid was approximately $2.77 per bbl.

Indications are that the 1937 business of the plant will be the largest in its history. Sales manager E. E. Hartley is reported to have said that shipments of cement for the month of June represent the second largest month's business done since the establishment of the state plant 12 years ago.

Discontinues Quarry

PACIFIC PORTLAND CEMENT Co., Auburn, Calif., limestone quarry operation has been discontinued, according to local report. The quarry had been operated a part of every year to supply stone for sugar manufacturing purposes.

New Plant

BATES, EHLERS AND MATHIS, Tishomingo, Okla., have started construction of a 60-x128-ft. building to house their concrete pipe manufacturing equipment now in a structure on the city fair grounds. This equipment includes new McCracken and Quinn pipe machines.

HINTS AND HELPS FOR SUPERINTENDENTS

Ground storage in three compartments with recovery from gates beneath to belt-bucket elevator to car loading hopper

Compact Ground Storage

A SOUTHERN CRUSHED-STONE PLANT has installed a compact ground storage system of its own design, illustrated herewith. An overhead belt from the bins carries the product of different sizes to discharge at the top of a three-compartment, or segmented, ground space formed by triangular wooden panels.

Each size of material can be chuted to its own compartment.

To recover the stocked stone, a gate (14-in. square) near the axis of the structure is located under each pile. This gate (operated from above) feeds the boot of a belt-bucket elevator (30-ft centers) that discharges to a 10-cu. yd. concrete bin, from which railway cars or trucks are loaded by gravity. A small, air-operated hoist and a drag bucket is used to pull the stone from the outlying parts of the bins to the discharge chutes under the ground storage.

Bin Salvage

By ROSS WHEELTON,
Hamilton, Ont.

THE ACCOMPANYING VIEW, Fig. 1, shows a set of bins for the storage of concrete aggregate. A bucket elevator conveys the material from a track hopper at the extreme right of the illustration up to the peak of the wooden structure where it is discharged into a chute which runs it to its respective bin. Motor trucks drive under the bins and load from gates in the bottom of the bins.

This layout proved satisfactory for several years, but eventually more storage space was required, so to provide for this a similar bin was built at right angles to the older bins and adjoining the bucket conveyor, so that it would serve to elevate the material for both. The new set of bins were of the same construction as the old, the lower section being of concrete, the upper of timber. These new bins increased the capacity of the unit considerably, but expansion of business soon taxed its capacity, so as a makeshift method of storing more material to provide for a shortage in the winter months, when the producers were not shipping, a hole was cut in the side of the bin and a stock pile made on the ground, as can be seen in Fig. 1.

This was quite satisfactory for the first winter, but at best it was a make-

Fig. 1: Original wooden bin structure with overflow spout for ground storage; recovery by locomotive crane. This system of recovery was much simplified by addition of steel bin shown in Fig. 2

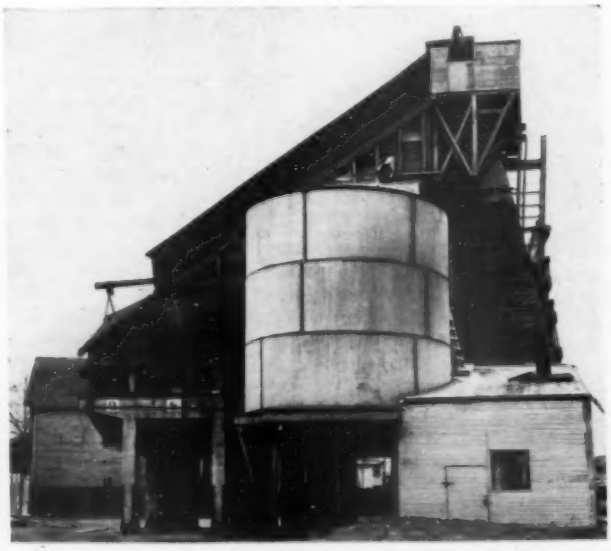


Fig. 2: Steel bin added increased storage capacity and reduced handling cost; also was salvaged and used at a new location

shift, as is obvious, the loading out from this stock pile was costly. The next year a steel tank was set up on a structural steel frame shown in Fig. 2. The trucks could run underneath and load with facility the other bins provided.

Some time after market conditions changed, making it no longer profitable to ship in by rail, due to many producing plants locating close to the market, the motor trucks hauling direct from the plant to the job. Therefore, the supply dealers owning these bins went into the producing business, and wishing to vacate the premises, which were rented, had to wreck this whole bin unit. The steel tank was unbolted and transported to the new property, where it could be built into the new plant.

As market conditions are constantly changing, nothing in the way of material handling equipment can be considered permanent, therefore steel construction for this type of structure obviously offers many advantages, not the least of which is the salvage possibilities, if the unit is properly planned with this feature in mind at the outset.

Gauging Bins

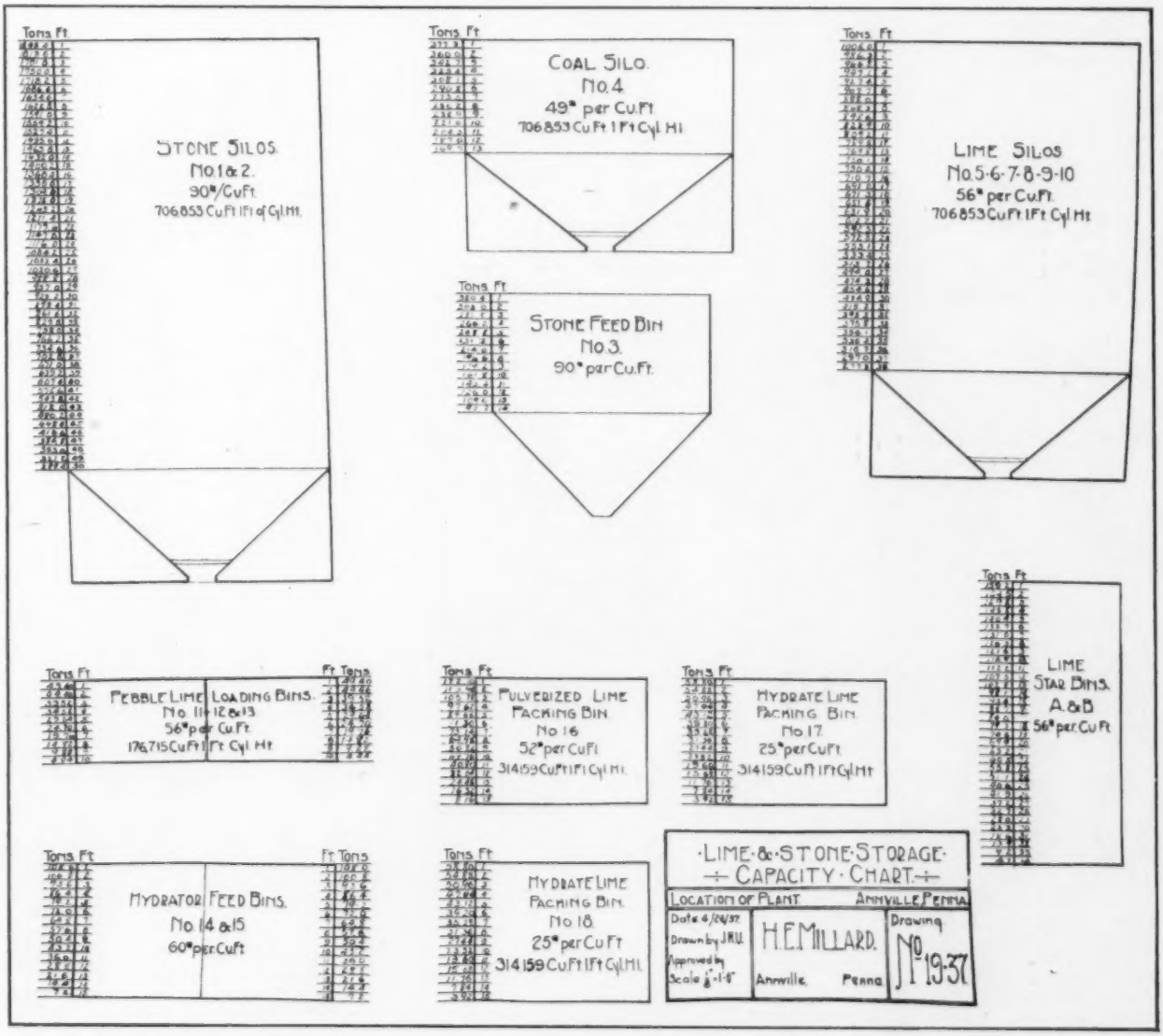
FOR PLANTS which are not provided with track scales the scheme of estimating the amount of material loaded out of bins and silos devised by H. E. Millard, at his new lime plant described elsewhere in this issue, may prove helpful. The chart below shows how each bin and silo has been gauged for each foot of depth.

By calculating the tonnage from the cubic foot capacity and the weight of each material per cubic foot, determined experimentally, the tonnage removed or the tonnage remaining in the bin may be readily determined by "sounding" the depth of material from the top, making due allowance, of course, for the coning of the material in the bins. With experience tonnages removed for shipment, or for processing, can thus be determined with accuracy.

On some of the smaller bins a "Bindicator", a patented manufactured float device, now on the market, is used to provide the "sounding".

Cost Saver

AT A CEMENT PLANT, swing hammers in a rock-crushing mill are successfully hard-faced with "'Hascrome". The mill is equipped with 27 manganese steel hammers weighing 95 lb. each. The hammers are 5x8x13-in. and run at 680 r.p.m. crushing 200 tons of rock per hr. The cost of these hammers was $13.30 each and the life was approximately 60 days. Hammers rebuilt on the wearing corners and faces run from 60 to 90 days. The cost is $7.00 each and they can be rebuilt many times.



Recent Quotations on Rock Products Securities

Stock	Date	Bid	Asked	Dividends	
Aetna P. C., cap.[51]	7-21-37	22	..		
Allentown P. C. (Penn.), com.[51]	7-21-37	6	..		
Allentown P. C. (Penn.), 6% cum. pfd.[51]	7-21-37	9¾	..		
Alpha P. C., com.	7-23-37	26	27⅞	actual sale .25	Sept. 25
American Aggregates, 1st mtg., 3/6's 1943, new bonds[48]	7-16-37	60	..		
American Aggregates, 6's 1943, old[48]	7-16-37	60	..		
American Aggregates, com.[48]	7-16-37	3	4		
American Aggregates, pfd.[48]	7-16-37	16	..		
Arundel Corp., com.	7-20-37	20½	actual sale	{ .25(qu.) / .25(ex.)	July 1 / July 1
Ash Grove L. & P. C., com.[51]	7-21-37	13	..		
Ash Grove L. & P. C., pfd.[51]	7-21-37	98¾	..		
Bessemer L. & C., com.[48]	7-16-37	8	9		
Bessemer L. & C., pfd.					
Bessemer L. & C., 1st 6½'s, 1947[48]	7-16-37	95	97		
Bessemer L. & C., 6's, 1955[51]	7-21-37	95	98		
Boston S. & G., com.[37]	7-16-37	½	2		
Boston S. & G., 7% pfd.[37]	7-16-37	7	10		
Boston S. & G., 7's 1939[37]	7-16-37	80	..		
Calaveras Cement, com.[40]	7-19-37	7¼	8½		
Calaveras Cement, 7% pfd.[40]	7-19-37	99	100½	2.00	June 30
California Art Tile, A[9]	7-20-37	17	17½		
California Art Tile, B[9]	7-20-37	4	5		
Canada Cement, com.	7-23-37	15	16½	actual sale	
Canada Cement, pfd.	7-23-37	106	110	1.00	June 21
Canada Cement, 4¼'s, 1951[42]	6-17-37	103¼	104½		
Canada Crushed Stone, 5½'s, 1944[42]	6-17-37	101	..		
Carolina P. C., 8% cum. pfd.[51]	7-21-37	41	..		
Consol. Cement A	6-22-37	6	..		
Consol. Cement, 1st 6's 1948[50]	7-19-37	82½	83½		
Consol. Okla. S. & G., 6½'s 1948[42]	6-17-37	32	..		
Consol. S. & G. pfd.	7-30-37	47	60	actual sale	
Consol. Rock Products, units[50]	7-19-37	1	1½		
Consumers R. & G. 1st Mtg., 6's 1948[51]	7-21-37	40	..		
Coosa P. C., 1st 6's[51]	7-21-37	50	..		
Coplay Cement Mfg., pfd.[50]	7-19-37	15	..		
Coplay Cement Mfg., 6's 1941[50]	7-19-37	90	..		
Cumberland P. C., units[51]	7-21-37	57	..		
Cumberland P. C., 7's, 1937[51]	7-21-37	100	..		
Dewey P. C., com.[51]	7-21-37	70	..		
Diamond P. C.	7-20-37	..	16	.25	July 20
Dolese & Shepard	7-23-37	40	43		
Federal P. C., 5's 1947[51]	7-21-37	60	..		
Federal P. C., 6½'s, 1941[48]	7-16-37	60	..		
Fla. P. C., units[50]	7-19-37	35	38		
Fla. P. C., 6½'s 1937[48]	7-16-37	100	100½		
Giant P. C., com.[50]	7-19-37	3¼	4¼		
Giant P. C., pfd.[50]	7-19-37	15	17		
Glens Falls P. C., com.[51]	7-21-37	13	16		
Glens Falls P. C., pfd.[51]	7-21-37	82	92		
Great Lakes P. C., B[51]	7-21-37	¾	..		
Gyp., Lime & Alabastine	7-20-37	13	14½		
Gyp., Lime & Alabastine, 5½'s, 1948[42]	6-17-37	101¾	102½		
Hawkeye P. C., cap.[50]	7-19-37	54	..		
Hercules Cement, com.[51]	7-21-37	56	63		
Hercules Cement, pfd.[50]	7-19-37	100	..		
Hermitage P. C., com.[51]	7-21-37	15	..		
Hermitage P. C., pfd.[51]	7-21-37	102	..		
Ideal Cement, com.[50]	7-19-37	80	82	1.50	May 27
Kelley Island L. & T.	7-23-37	25	26	.40	June 30
Ky. Rock Asphalt, 6½'s, 1936[46]	7-16-37	40	45		
Ky. Stone Co., v.t.c.[46]	7-16-37	4½	..		
Ky. Stone Co., 5%, 1956[46]	7-16-37	47½	..		
Keystone P. C., pfd.[51]	7-21-37	32	..		
Lawrence P. C., com.	7-14-37	35	37		
Lawrence P. C., 5½'s, 1942[20]	7-19-37	100½	..		
Lehigh P. C., com.	7-20-37	33	34⅞	.37½(qu.)	Aug. 2
Lehigh P. C., 4% pfd.	7-20-37	170	179	1.00(qu.)	July 1
Lone Star Cement, com.	7-23-37	56¼	56¾	.75(qu.)	June 30
Louisville Cement	7-26-37	44	47		
Lyman-Richey, 1st 6's, 1939-40[51]	7-21-37	68	..		
Marbelite Corp., com.[40]	7-19-37	30	60		
Marbelite Corp., pfd.[40]	7-19-37	4	5		
Marblehead Lime, 7's, 1944[34]	7-16-37	90	..		
Marquette Cement, com.	7-23-37	45	47	1.00	July 1
Marquette Cement, pfd.[50]	7-19-37	103	..	1.50	July 1
Material Service Corp.[50]	7-19-37	19	21		
McCrady-Rodgers, com.[50]	7-19-37	6	9		
McCrady-Rodgers, 7% pfd.[50]	7-19-37	30	40		
Medusa P. C., com.	7-24-37	41	..		
Medusa P. C., 6% cum. pfd.[51]	7-21-37	99	..		
Michigan L. & C., com.[51]	7-21-37	88	..		

Stock	Date	Bid	Asked	Dividends	
Minnesota Mining & Mfg. Co.	6-16-37	39	..		
Missouri P. C.	7-24-37	20	..	.50	June 30
Monarch Cement, cap.[51]	7-21-37	100	..	4%	July 1
Monolith P. C., com.[9]	7-20-37	3½	4		
Monolith P. C., 8% pfd.[9]	7-20-37	7¼	7¾		
Monolith P. C., 1st mtg.[9]	7-20-37	103	105		
Monolith Portland Midwest, pfd.[9]	7-20-37	3½	4		
National Gypsum, A., com.	7-23-37	13	13½		
National Gypsum, 7% pfd.	7-24-37	102	104	1.75	July 3
National Gypsum, 5% pfd.	7-23-37	17	18	.25	July 3
National L. & S., 6½'s, 1941[46]	7-16-37	90	92		
Nazareth Cement, com.[50]	7-19-37	8	10		
Nazareth Cement, 7%, pfd.[50]	7-19-37	90	..		
Newaygo P. C., pfd.[51]	7-21-37	90	..		
New England Lime, units[14]	7-16-37	17½	..		
N. Y. Trap Rock, 6's, stamped, 1946					
N. Y. Trap Rock, 7% pfd.[46]	7-16-37	75	..	3.50	July 6
North Amer. Cement, 6¼'s, 1953[50]	7-19-37	53½	54½		
North Amer. Cement "A" pfd.[50]	7-19-37	8	9½		
North Amer. Cement, com. A[50]	7-19-37	5½	7		
North Amer. Cement, 6½'s, 1940[50]	7-19-37	97½	99		
North Amer. Cement, 6½'s, 1943[50]	7-19-37	97½	99		
North Amer. Cement "B" pfd.[50]	7-19-37	13	14½		
North Shore Mat., 1st 6's[20]	7-19-37	47	..		
Northwestern P. C., units[9]	7-20-37	75	83		
Northwestern P. C., pfd.				2.50	July 1
Northwestern States P. C.[50]	7-19-37	24½	26½		
Ohio River S. & G., com.	7-26-37	1	..		
Ohio River S. & G., 1st pfd.	7-26-37	79	..		
Ohio River S. & G., 2nd pfd.	7-26-37	5	..		
Ohio River S. & G., 6's[46]	7-16-37	13	..		
Oregon P. C., com.[40]	7-19-37	4	4¾		
Oregon P. C., 1st pfd.[40]	7-19-37	98	..		
Oregon P. C., conv. pfd.[50]	7-19-37	55	57		
Pacific Coast Aggr., new com.[40]	7-19-37	2	2½		
Pacific Coast Cement, com.[51]	7-21-37	45	52		
Pacific Coast Cement, 1st pfd.[51]	7-21-37	3	4½		
Pacific P. C., com.[40]	7-19-37	3½	5		
Pacific P. C., pfd.[40]	7-19-37	46¾	52		
Peerless Cement, com.[50]	7-19-37	6	6½		
Penn.-Dixie Cement., com.	7-23-37	7¼	7⅝		
Penn.-Dixie Cement, pfd. A	7-23-37	53	54⅝		
Penn.-Dixie Cement, 6's A, 1941					
Penn. Glass Sand Corp., v.t.c.	7-23-37	27¼	28	.25	July 1
Penn. Glass Sand Corp., pfd.	7-23-37	120	..	1.75	July 1
Petoskey P. C., com.[51]	7-21-37	9¼	10½		
Republic P. C., com.[51]	7-21-37	9½	..		
Riverside Cement, A[9]	7-20-37	13½	15	.25	Aug. 1
Riverside Cement, B[9]	7-20-37	2½	3¼		
Riverside Cement, pfd.[9]	7-20-37	94	96	1.50	Aug. 1
Rockland & Rockport Lime, com.[34]	6-22-37	2	..		
Santa Cruz P. C., pfd.[9]	7-20-37	39	40½	.50	July 1
Schumacher Wallboard, com.[9]	7-20-37	5½	6¼		
Schumacher Wallboard, pfd.[9]	7-20-37	21	22		
Signal Mt. P. C., com.[50]	7-19-37	2½	4		
Signal Mt. P. C., pfd.[50]	7-19-37	74½	76		
Signal Mt. P. C., units[50]	7-21-37	70	..		
Southern States P. C., cap.[51]	7-21-37	42	..		
Southwestern P. C., units[40]	7-19-37	190	..		
Spokane P. C., units	7-30-37	5	5¾		
Standard Pav. & Mat., com.	7-30-37	32½	33		
Standard Pav. & Mat., pfd.	7-10-37	18	19¼		
Standard Silica					
Superior P. C., pfd.	7-19-37	41	58		
Superior P. C., A[40]	7-19-37	19	20½		
Superior P. C., B[40]					
Trinity P. C., units[50]	7-19-37	77	..		
U. S. Gypsum, com.	7-21-37	115	116	.50	July 1
U. S. Gypsum, pfd.	7-20-37	159¾	164	1.75	July 1
Volunteer P. C., 1st 7's, 1942[46]	7-16-37	85	..		
Volunteer P. C., units[46]	7-16-37	80	..		
Vulcanite P. C., com.[48]	7-16-37	10	..		
Vulcanite P. C., 7½'s, 1943[20]	7-16-37	92	95		
Wabash P. C.[20]	7-19-37	10	..		
Warner Co., ww. 1st 6's, 1944[46]	7-16-37	91	92		
Warner Co., com.[50]	7-19-37	12	13½		
Warner Co., pfd.[50]	7-19-37	23½	26		
Whitehall Cement Mfg., com.[51]	7-21-37	85	95		
Whitehall Cement Mfg., pfd.[51]	7-21-37	51	56		
Wisconsin L. & C., 1st 7's, 1940[14]	7-16-37	75	..		
Wolverine P. C., com.	6-17-37	4⅝	..		
Yosemite P. C., 4% pfd.[40]	7-19-37	4	4½	.10(qu.)	July 1

Quotations by [9]A. E. White Co., San Francisco, Calif. [14]The Securities Co. of Milwaukee, Inc., Milwaukee, Wis. [20]Wise, Hobbs & Seaver, Inc., Boston. [40]Martin Judge Jr., and Co., San Francisco, Calif. [42]Nesbitt, Thomson & Co., Ltd., Toronto, Ont. [46]First National Bank of Chicago, Chicago, Ill. [48]Hewitt, Ladin & Co., New York, N. Y. [50]Rogers & Tracy, Inc., Chicago, Ill. [51]Paul D. Sheeline & Co., Boston, Mass.

RECENT DIVIDENDS ANNOUNCED

Alpha Portland Cement (quar.)	.25	Sept. 25
Diamond Portland Cement	.25	July 20
Lehigh Portland Cement (quar.)	.37½	Aug. 2
Monarch Cement Co.	4%	July 1
Medusa Portland Cement com.	1.00	July 1
Medusa Portland Cement pfd.	1.50	July 1
N. Y. Trap Rock 7% pfd.	3.50	July 6
Riverside Cement, A	.25	Aug. 1
Riverside Cement, pfd.	1.50	Aug. 1

PENNSYLVANIA - DIXIE CEMENT CORP., New York City, for the 12 months ended June 30, 1937, reports, subject to audit and year-end adjustments, profit of $198,002 after depreciation, depletion, ordinary taxes, interest, etc., but before federal income and undistributed profits taxes. This compares with net loss of $618,397 in 12 months ended June 30, 1936.

Consolidated income account for 12 months ended June 30, 1937, compares as follows:

	1937	1936
Sales, less discounts and allowances	$6,321,772	.....
Costs, expenses and ordinary taxes	4,682,098	.....
Depreciation and depletion	‡978,511	.....
Operating profit	$661,163	.....
Other income	36,531	.....
Total income	$697,694	*$53,284
Interest	499,692	520,888
Federal income taxes	.....	†44,225
Profit before federal tax	$198,002	*$618,397

*Loss. †Provision for federal income tax, notwithstanding statement shows a loss, results from requirement by Internal Revenue Bureau that depreciation for income tax purposes be calculated on original property values, whereas on books of company it is calculated on sound property values determined by appraisal and set up on the books at the inception of the corporation. ‡For the period January 1, 1937, to June 30, 1937, depreciation has been charged to operations on the basis of cost of properties to the predecessor companies, which is also the basis allowable for federal income taxes. Additional provision for depreciation amounting to $373,405 for the six months, together with $5,052 on account of properties written off, has been reflected in the transfer out of special reserve.

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LONE STAR CEMENT CORP., New York City, reports for quarter ended June 30, 1937, subject to audit and year-end adjustments, consolidated net profit of $1,188,733 after depreciation, depletion, interest, federal income taxes and provision for contingencies, etc., equivalent to $1.23 a share on 967,095 no-par shares of capital stock. No provision was made for surtax on undistributed profits.

This compares with $735,704, or 76 cents a share on 967,070 shares in preceding quarter, and $746,981, or $1.10 a share, on 678,791 shares in June quarter of previous year.

For six months ended June 30, 1937, net profit totaled $1,924,437, equal to $1.99 a share on 967,095 shares, comparing with $1,215,286, or $1.79 a share on 678,791 shares for the six months ended June 30, 1936.

Consolidated income account for quarter ended June 30, 1937, compares as follows:

	1937	1936
Sales	$5,993,524	$4,769,883
Cost and expenses	3,597,561	2,850,674
Operating profit	$2,395,963	$1,919,209
Other income	54,141	37,451
Total income	$2,450,104	$1,956,660
Interest, etc.	577	117,161
Federal income taxes, etc.	257,405	181,053
Depreciation and depletion	800,898	789,160
*Miscellaneous charges	202,490	122,305
Net profit	†$1,188,733	$746,981

Six months ended June 30:

	1937	1936
Sales	$10,276,363	$8,406,706
Cost and expenses	6,286,661	5,157,275
Operating profit	$3,989,702	$3,249,431
Other income	94,972	73,096
Total income	$4,084,674	$3,322,527
Interest, etc.	2,158	248,273
Federal income taxes, etc.	431,459	327,113
Depreciation and depletion	1,375,994	1,290,384
*Miscellaneous charges	350,626	241,472
Net profit	†$1,924,437	$1,215,285

*Includes provisions for doubtful account and contingencies. †No provision has been made for surtax on undistributed profits.

◇ ◇ ◇

NORTH AMERICAN CEMENT CORP., Albany, N. Y., reports for the 12 months ended June 30, 1937, net loss of $336,407 after taxes, depreciation, depletion and interest, but before profit on bonds acquired against net loss of $528,183 for the 12 months ended June 30, 1936.

◇ ◇ ◇

CONSOLIDATED ROCK PRODUCTS CO., Los Angeles, Calif., reports sales of all products, after deducting discounts and allowances, in the five months ended May 31, 1937, totaled $1,448,204, compared with $941,582 in the first five months of 1936, an increase of 64.4%. Net sales in the first five months of this year were equivalent to a little more than half the sales for the full 12 months of 1936, when the total was $2,865,939.

The increase in volume of business handled so far this year has materially improved the company's operating position. Net earnings for the five months to May 31 before depletion, depreciation and amortization charges, totaled $118,288, as compared with net earnings of $84,169 in the corresponding period last year before similar deductions.

Within a short time the company's income from outside sources may be augmented by revenue from oil production from the Wilmington oil field. A lease has just been negotiated with Sovereign Oil Corp. and F. C. Hall, Inc., on a two acre property owned at Wilmington which calls for a bonus of $5,000 payable out of oil and a 20% royalty on all production.

LYMAN-RICHEY SAND AND GRAVEL CORP., Omaha, Neb., reports for the year ending March 31, 1937, a net loss of $32,259. The balance sheet as of January 31, 1937, showed current assets, $149,325, and current liabilities, $43,837.

◇ ◇ ◇

DIAMOND PORTLAND CEMENT CO., Middle Branch, Ohio: Merrill Turben & Co., brokers, Cleveland, Ohio, are offering 21,000 shares of $1 par common stock at $16 per share. This stock represents 30% of the 72,000 outstanding shares recently acquired from two estates.

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GLENS FALLS PORTLAND CEMENT CO., Glens Falls, N. Y., has increased its capital stock from 45,000 to 51,000 shares; of these 1000 are of par value $100 each, and 50,000 no par value.

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BESSEMER LIMESTONE & CEMENT CO., Youngstown, Ohio, reports for the three months ended March 31:

	1937	1936
Net sales	$297,856	$168,727
Net profit	22,165	(d)54,825
Times interest earned	271	.....
Earned per share, preferred	$0.87	.....
Earned per share, common	0.02	(d)$0.52

Preferred dividends in arrears March 31, 1937, were $4.50 per share. Current assets as of March 31, 1937, were $706,296; current liabilities, $183,350.

◇ ◇ ◇

DEWEY PORTLAND CEMENT CO., Kansas City, Mo., has merged with the Tyler Corp., a sort of family holding company which owned 32,381 shares of Dewey Cement Common, out of a total of 40,000 shares, and all but 1 of 2569 shares of Dewey preferred stock, and other securities and cash amounting to $750,000. As a result of the merger Dewey Cement will acquire the Tyler Corp.'s liquid assets and Tyler Corp. stockholders will receive Dewey Cement stock. This amounts to a cash sale of stock in the cement company. F. E. Tyler is president of both corporations.

◇ ◇ ◇

BASIC DOLOMITE, INC., Cleveland, Ohio, manufacturer of hard-burned dolomite for the steel industry, with plant at Maple Grove, Ohio, has filed a registration statement with SEC under Securities Act covering 140,000 shares of $1 par common stock to be offered publicly through underwriters to be named by amendment. Proceeds will be used to redeem bonds, pay rentals and for working capital.

◇ ◇ ◇

IDEAL CEMENT CO., Denver, Colo., directors have proposed to increase the number of common shares from 600,000 of no par value to 1,500,000 of $10 par value. Stockholders would receive 3 new shares for 1 of old.

AMERICAN SOCIETY FOR TESTING MATERIALS DISCUSSES

New Knowledge of Rock Products

AND MAKES SOME CHANGES IN SPECIFICATIONS

THE FORTIETH ANNUAL MEETING of the American Society for Testing Materials, New York, June 28 to July 2, had the largest registered attendance in the history of the organization and the most extensive exhibit of testing apparatus and related equipment ever sponsored by the society.

Reports of the various committees indicated that a tremendous amount of work had been done, much of which pertains particularly to the rock products and concrete products industries. In all, 52 proposed specifications and tests were accepted at the meeting as tentative, and 22 existing tentative specifications were recommended for adoption as standard.

Aggregates

Sessions dealing with "Road Materials" and "Cement and Concrete" had particular application to producers of aggregates, while discussions on "Bituminous Materials," "Masonry Materials" and "Methods of Testing" were of general interest.

Standardization of aggregate sizes was simplified at this meeting. Hitherto, A. S. T. M. specifications for concrete aggregates have been based on square opening sieves, while aggregates used in bituminous mixes have been specified on the basis of round openings. These divergent methods of testing were always an obstacle to any sound standardization of aggregate sizes.

At this meeting, the society, on the recommendation of the committee on road and paving materials, adopted a specification for standard sizes of coarse aggregates for highway construction based on square openings and on the Simplified Practice Recommendation R 163-36 of the National Bureau of Standards.

The A.S.T.M. standards provide for various local conditions by including group A and B sizes (see Tables 1 and 2) and without intention that all or a portion of the sizes from both groups will be adopted in any one locality. It is expected that in any marketing area specifications from either group A or B will be used dependent on which most closely fits local conditions.

Specifications under the jurisdiction of committee D-4 on road and paving materials are being revised to incorporate certain standard sizes from those listed in the tables.

Abrasion Testing

The Los Angeles (rattler) abrasion testing machine for coarse aggregates, which has already found wide acceptance and has been found acceptable by the American Association of State Highway Officials, has now been approved as a tentative test method by the society.

It is expected that considerable confusion will be eliminated since in the Los Angeles method of testing, the same test procedure is applied for all types of aggregates; and present indications are that comparable specification limits may be applied.

The Deval abrasion test is retained in the specifications, with minor revisions, but likely will be replaced when further information has been developed on the Los Angeles method of testing. In the Deval test, different testing procedures are used for gravel and for crushed stone or slag.

Deleterious Substances

Specifications for concrete aggregates were revised somewhat, but mainly in those provisions pertaining to the presence of deleterious matter. The specification places limitations on deleterious

TABLE 1—GROUP A. STANDARD SIZES OF COARSE AGGREGATES

Size Number	Nominal Size, Square Openings	Amounts Finer than Each Sieve (Square Openings), per cent by weight											
		4 in.	3½ in.	2½ in.	2 in.	1½ in.	1 in.	¾ in.	½ in.	⅜ in.	No. 4	No. 8	No. 100
PRIMARY SIZES													
No. 1A	2 to 3½ in.	100	90 to 100		0 to 15								
No. 2A	1 to 2 in.			100	90 to 100	35 to 70	0 to 15						
No. 3A	½ to 1 in.					100	90 to 100		0 to 15				
No. 4A	No. 4 to ½ in							100	90 to 100	40 to 75	0 to 15	0 to 5	
No. 5A	0 to No. 4								100		75 to 100		10 to 30
COMBINED AND MODIFIED SIZES													
No. 12A	1 to 3½ in.	100	90 to 100		25 to 60		0 to 15						
No. 23A	½ to 2 in.			100	90 to 100		20 to 55		0 to 15		0 to 5		
No. 234A	No. 4 to 2 in.			100	95 to 100		35 to 70		10 to 30		0 to 5		
No. 34A	No. 4 to 1 in.					100	90 to 100		25 to 60		0 to 10		
No. 345A	0 to 1 in.					100	90 to 100		30 to 65		10 to 25		0 to 10
No. 45A	0 to ½ in.							100	90 to 100				0 to 20
No. 3A (Modified)	No. 4 to 1 in.					100	90 to 100	40 to 75	5 to 20		0 to 5		
No. 4A (Modified)	No. 8 to ½ in.							100	90 to 100	40 to 70	5 to 25	0 to 5	
No. 5B (Modified)	No. 8 to ⅜ in.								100	90 to 100	10 to 30	0 to 8	

substances based on "recommended permissible limits" and "maximum permissible limits." A stipulation is made that the recommended limits should be specified wherever it is practicable to obtain materials conforming to them.

The new sections specify that the amount of deleterious substances shall not exceed the following limits:

DELETERIOUS MATTER IN FINE AGGREGATE

	Recommended Permissible Limits, Per Cent by Wgt.	Maximum Permissible Limits, Per Cent by Wgt.
Clay lumps, not more than	1	1.5
Coal and lignite	0.25	1
Material finer than No. 200 sieve:		
(a) in concrete subject to surface abrasion, not more than	2	3
(b) all other classes of concrete, not more than	3	5
Other deleterious substances (such as shale, alkali, mica, coated grains, soft and flaky particles)	as specified	as specified

DELETERIOUS MATTER IN COARSE AGGREGATE

	Recommended Permissible Limits, Per Cent by Wgt.	Maximum Permissible Limits, Per Cent by Wgt.
Soft fragments	2	5
Coal and lignite	0.25	1
Clay lumps	0.25	0.25
Material finer than No. 200 sieve	0.5	1
Other deleterious substances	as specified	as specified

In the coarse aggregate specification, when material finer than the No. 200 sieve consists essentially of crusher dust, the recommended and maximum permissible limits specified may be increased to ¾ and 1½%, respectively.

Soundness of Aggregates

The accelerated soundness test method for aggregates has been simplified and certain clarifying revisions have been incorporated. Previously there were two methods for making these tests, by use of sodium sulfate or magnesium sulfate—one for coarse aggregate and one for fine aggregate. The two methods have been combined into one, entitled "Tentative Method of Test for Soundness of Aggregates by Use of Sodium Sulfate or Magnesium Sulfate."

Light-Weight Aggregates

A new tentative specification, covering light-weight aggregates for concrete, was approved in response to a need of many years for standardized requirements. The specification includes requirements for grinding, unit weight, mortar strength and soundness. According to the requirement, light-weight aggregates shall consist of pumice, lava, tufa, slag, burned clay, burned shale and cinders derived from the high-temperature combustion of coal or coke, with definite limitations placed on volatile matter and loss on ignition.

Light weight aggregate meeting the grading requirements of the specifications, when tested in a dry condition, shall not weigh more than 70 lb. per cu. ft. for fine aggregate and 55 lb. for coarse aggregate. The latter figure may be changed to 75 lb. when lighter weight coarse aggregate is unavailable.

Blended Cements

A new specification was proposed at the meeting to govern the manufacture and methods of test for blended cements. The specification as proposed was rejected by a close vote and was referred back to the committee for further consideration. The specification necessarily covered a wide variety of materials which are blended with portland cement as admixtures. Admixtures were specified as puzzolanic materials, cementitious materials, accelerators, plasticizers, retarders, waterproofing materials and inert non-deleterious siliceous materials. It was specified that the specific surface be not less than 1800 sq. cm. per gram, and that the residue on a standard No. 325 sieve shall not exceed 15% by weight.

Portland Cement

Proposed revisions in the tentative method of test for compressive strength of portland cement mortars were approved and a revision for immediate adoption in the specifications for portland cement will be referred to the society for letter ballot.

TABLE 2—GROUP B, STANDARD SIZES OF COARSE AGGREGATES.

Size Number	Nominal Size, Square Openings	Amounts Finer than each Sieve (Square Openings, per cent by weight												
		4 in.	3½ in.	3 in.	2½ in.	2 in.	1½ in.	1 in.	¾ in.	½ in.	⅜ in.	No. 4	No. 8	No. 100
PRIMARY SIZES														
No. 1B	2½ to 3½ in.	100	90 to 100	35 to 70	0 to 15	.....	.....	.....	.....	.....	.....	.....	.....	.....
No. 2B	1½ to 2½ in.	.....	.....	100	90 to 100	35 to 70	0 to 15	.....	.....	.....	.....	.....	.....	.....
No. 3B	¾ to 1½ in.	.....	.....	.....	.....	100	90 to 100	20 to 55	0 to 15	.....	.....	.....	.....	.....
No. 4B	⅜ to ¾ in.	.....	.....	.....	.....	.....	.....	100	90 to 100	20 to 55	0 to 15	.....	.....	.....
No. 5B	No. 4 to ⅜ in.	.....	.....	.....	.....	.....	.....	.....	.....	100	90 to 100	0 to 20	0 to 5	.....
No. 6B	0 to No. 4	.....	.....	.....	.....	.....	.....	.....	.....	.....	100	85 to 100	.....	10 to 30
COMBINED AND MODIFIED SIZES														
No. 12B	1½ to 3½ in.	100	90 to 100	100	35 to 70	.....	0 to 15	.....	.....	.....	.....	.....	.....	.....
No. 23B	¾ to 2½ in.	.....	.....	.....	90 to 100	.....	25 to 60	.....	.....	.....	0 to 10	.....	.....	.....
No. 34B	⅜ to 1½ in.	.....	.....	.....	.....	100	90 to 100	.....	0 to 10	.....	.....	0 to 5	.....	.....
No. 3A (Modified)	No. 4 to 1 in.	.....	.....	.....	.....	.....	100	90 to 100	.....	5 to 20	.....	0 to 5	.....	.....
No. 345B	No. 4 to 1½ in.	.....	.....	.....	.....	100	95 to 100	.....	30 to 65	.....	10 to 30	0 to 5	.....	.....
No. 45B	No. 4 to ¾ in.	.....	.....	.....	.....	.....	.....	100	40 to 75	.....	20 to 55	0 to 10	0 to 5	.....
No. 456B	0 to ¾ in.	.....	.....	.....	.....	.....	.....	100	35 to 70	.....	30 to 65	10 to 25	.....	0 to 10
No. 56B	0 to ⅜ in.	.....	.....	.....	.....	.....	.....	.....	90 to 100	100	90 to 100	.....	.....	0 to 25
No. 5B (Modified)	No. 8 to ⅜ in.	.....	.....	.....	.....	.....	.....	.....	90 to 100	100	90 to 100	10 to 30	0 to 8	.....
No. 45B (Modified)	No. 8 to ¾ in.	.....	.....	.....	.....	.....	.....	100	90 to 100	.....	30 to 65	5 to 25	0 to 5	.....

Fineness Requirements

One change in portland cement specifications provides for the elimination of the fineness test on the No. 200 sieve. Data developed by a special committee show that sieve residues have little or no relation to the fineness as indicated by specific surface. In the report of this committee it was indicated that "the general opinion is that the present fineness requirement has been meaningless for many years. This requirement should either be eliminated, or if a fineness test is deemed necessary by a majority, it should be replaced by some method that furnishes dependable information on particle size distribution, specific surface or minimum percentage of some fine fraction designated by maximum particle size."

In the present transitional stage, the society's standards for hydraulic cements exhibit quite a difference in fineness requirements, a fact that emphasizes the need for work which the subcommittee on fineness has under way. Under present cement specifications, that for high early strength cement requires fineness determination by use of the turbidimeter, the natural cement specifications after revision also require fineness determination by turbidimeter, while specifications for portland cement contain no fineness requirement. The committee recommended the continuance as tentative for another year of the method of test for fineness of portland cement by means of the turbidimeter.

Among other cement specification developments is the completion of the first draft of a specification for types of cement containing predominating amounts of slag for the setting of masonry, and the adoption of a new revised standard for natural cement, which has gone unchanged since 1909.

Cement Additions

The adoption of the revised standard specifications for high early strength portland cement has necessitated the creation of a new subcommittee on tests of additions to cement. This new committee's duties were to determine the tests needed to find out whether an addition was harmful or not, to outline in a general way the test procedure, and after completion of the tests to analyze the data and finally to decide whether or not the additions under investigation were harmful. A proposed general program of tests was prepared, details of which were to be carried out by the Cement Reference Laboratory. The Laboratory is now making tests of one type of addition to three brands of high early strength portland cement.

Concrete vs. Mortar Test Cubes

As an acceptance test for cement, the subcommittee on plastic mortars reported that it is experimenting with concrete instead of mortar. Work under way so far indicates that this concrete is far more plastic than the specified mortars.

It has been found that in spite of its containing aggregate passing a $\frac{3}{8}$-in. and retained on the No. 4 sieve it can be readily molded into a 2-in. cube and yields a specimen subject to very little water loss through bleeding during the setting of the cement. So far, the use of the concrete as an acceptance test for cement has proven favorable and standard materials for such a purpose may be readily secured.

The working committee on volume change and soundness of portland cement has been continuing its studies of volume changes induced by subjecting bars of plastic paste after the first 24 hr. hardening under normal conditions to a period of treatment at elevated pressures and steam temperatures.

Autoclave

The much discussed autoclave test has been studied quite intensively, mainly in regard to a shorter steaming cycle because of the desirability of having a shorter period for an accelerated test. This cycle comprises a total period of 5 hours in the autoclave and includes a 1-hr. rise to the maximum temperature of 420 deg. F. and a 1-hr. cooling period. Recent studies have included a comparison of this cycle with the longer periods at 350 deg. F., described in the earlier report.

New equipment for this test has now been made available commercially and the committee is beginning a series of coöperative tests in ten laboratories to aid in the development of suitable standardized testing procedure. Among the variables to be studied in this series are the maximum temperature and duration of the steaming cycle, length of specimens, age at test, consistency of the mix, time required for cooling the specimens before measuring for length, and the uniformity of results obtained in different laboratories on the same cements and on specimens tested on different days.

STANDARD SIZES OF LIGHT-WEIGHT AGGREGATE

Size Designation	Percentages Passing Sieves Having Square Openings								
	1 in.	¾ in.	½ in.	⅜ in.	No. 4	No. 8	No. 16	No. 50	No. 100
Fine Aggregate:									
¼ in. to dust	.....	.....	.....	100	95 to 100	.....	45 to 80	10 to 30	5 to 15
⅜ in. to dust	.....	.....	100	95 to 100	55 to 80	.....	.....	10 to 25	5 to 15
Coarse Aggregate:									
½ in. to No. 4	.....	100	90 to 100	40 to 75	0 to 15	0 to 5	.....	.....	.....
¾ in. to No. 4	100	90 to 100	.....	20 to 55	0 to 10	0 to 5	.....	.....	.....

Clinker Studies

Three highly interesting papers were presented in the session on concrete. L. S. Brown, research petrographer, Lone Star Cement Corp., in his illustrated paper "Tricalcium Aluminate and the Microstructure of Portland Cement Clinker," pointed out that the recognition of C_3A in portland cement clinker by microscopic examination has been found exceedingly difficult.

To determine its relation to the structure of clinker about 150 experimental burns were made, ranging from pure C_3A through high-alumina-silicate mixes into the field of portland cement compositions. The charges were examined in thin sections.

It was found that C_3A crystallizes in large units, enclosing C_3S, and CaO when present, but with a tendency to exclude C_4AF. In this habit, C_3A becomes a matrix or interstitial material which is quite difficult to distinguish. Its presence is demonstrated indirectly through its control over the orientation of C_4AF crystallites. Common lack of such criteria in commercial clinker indicates that crystalline C_3A is not present to the extent generally calculated.

Freezing of Concrete

Prof. H. H. Scofield, Cornell university, reported on "Some Tests to Show the Effect of Freezing on the Permeability, Strength and Elasticity of Concretes and Mortars." Some 1500 test specimens were made and tested under laboratory conditions to show the effect of freezing. Six different types of cements were used in concretes or mortars with sand and gravel as aggregates. Specimens to be frozen immediately were subjected, as soon as molded, to a freezing temperature of about 10 deg. F. for periods of one or seven days. Other specimens were subjected to a delayed freezing cycle in which the

concrete was allowed to harden for varying periods before freezing. The freezing period for these specimens was two days at 5 deg. F.

The average loss in strength for concretes frozen immediately after molding was from 40% to 60% of the strength of normal unfrozen concrete at the same age. There was no definite difference between the 1-day and 7-day freezing period, and little variation was noted in the difference between a rich mix and a lean mix in their resistance to immediate freezing.

Dry concretes and those tested at one and four years seemed to show less proportionate percentage loss. At early ages, there was indication that dry concretes suffer less injury than wet concretes. Of the various cements under consideration, the high-alumina-cement concrete alone showed indications of setting and hardening during the freezing period.

The relative porosity of the concretes was measured by the rate of leakage of water, in the permeability tests. Concretes which had very little porosity unfrozen showed relatively great porosity after being frozen before hardening. Results seem to indicate that dry concretes (2-in. slump) may be frozen solid without serious injury if cured for 24 to 48 hr. in dry conditions before freezing. Wet concretes (9-in. slump) require considerably longer precuring before freezing in order to be uninjured by freezing.

Moist-cured specimens required a longer precuring period than dry-cured specimens before freezing in order that the concrete be uninjured by freezing. Dry mortars were injured less than wet mortars and the addition of 10% of hydrated lime did not appreciably affect results from freezing.

Cement and Plastic Flow

One of the outstanding papers presented at the annual meeting was one by R. E. Davis, H. E. Davis and E. H. Brown, University of California, on "Plastic Flow and Volume Changes of Concrete," giving the results of research work carried on for many years. The paper was chiefly devoted to volume changes under the action of sustained loads, which is already leading to marked changes in design and construction practices as more is learned about the true behavior of concrete under continued loading.

Recent series of tests have included studies to determine the effect of water-cement ratio and aggregate-cement ratio upon plastic flow, the effect of fineness and composition of cement upon plastic flow, the plastic flow of concretes in tension and in compression, fiber strains in plain concrete beams under constant sustained bending moment and stresses developed in large concrete cylinders under complete axial restraint during a heating-cooling cycle similar to that which will occur in mass concrete.

The effect of water-cement ratio upon plastic flow is marked. Results show that between two concretes of equal cement content, the one having the higher water-cement ratio exhibits the largest flow. For concretes of the same water-cement ratio, richer mixes exhibit greater flow and the magnitude of flow is directly proportional to the cement content. There appears the possibility that the particle size distribution of a cement, through its effect upon the structure of the hardened cement paste, may have an important influence upon the rate and magnitude of volume changes in general.

Experience with certain cements has exploded the theory that the flow of concrete in tension is about the same as that in compression. Tests for some cements, including low-heat and normal portland, indicate that the flow in tension is considerably higher than that in compression, at least in the early ages.

The composition of cement used has a marked effect upon plastic flow in compression. Up to four months, the flow of the low-heat portland concrete is about double that of the normal portland. Also, it has been observed that concrete containing coarsely ground, low-heat portland cement exhibited much the largest plastic flow at all ages.

Concrete Masonry

New tentative specifications and methods of test for concrete units for non-load-bearing masonry include requirements for compressive strength and moisture content at the time of sampling, in addition to limits on dimensions, workmanship and finish.

Average compressive strength of five units at the time of delivery to the site shall not average less than 350 lb. per sq. in. based on gross area and no single specimen shall test less than 300 p.s.i.

No over-all dimension will be permitted to vary more than 3% over or under the specified dimensions for any form or size of unit and the minimum face shell thickness shall be not less than ½ in. at any point.

It is specified that units shall contain no materials that will stain plaster and that the combustible content present in cinder concrete shall not exceed 35% of the weight of the aggregate.

All units must be sound and free from cracks and defects and those intended to serve as a base for plaster or stucco shall have a sufficiently rough surface for bond. All units must bear a distinctive mark of the manufacturer or shall otherwise be readily identified as to origin.

Concrete Pipe

Committee C-13 on concrete pipe recommended that the tentative specifications for reinforced-concrete culvert pipe be revised and it was adopted as standard with several minor changes. It was decided that the tentative specifications for concrete irrigation pipe be continued as tentative pending further consideration by the committee.

Gypsum

No great change took place in the specifications for gypsum. The standard specifications for sand for use in gypsum plaster and the tentative specifications for sand for use in lime plaster have been revised and combined into a single standard entitled "Tentative Specifications for Sand for Use in Plaster."

During the past year the standard specifications for gypsum lath, for gypsum wall board and for gypsum sheathing board were modified by the addition to the section on finish of a note referring to the availability of gypsum lath with one surface covered with aluminum foil, and of gypsum wall board and gypsum sheathing board with one or both surfaces covered with aluminum foil.

Some investigative work is being done on Keene's cement in an attempt to bring the A.S.T.M. specification into agreement with federal specifications. Differences are mainly in the tensile strength, fineness and testing consistency requirements.

Concrete Brick

For greater efficiency and to eliminate overlapping, the committees on brick and on hollow masonry building units were merged. At this meeting the committee on brick recommended for adoption a revision of the standard specifications for concrete building brick for the purpose of bringing the specifications into conformity with the testing procedure prescribed in the tentative methods of testing brick.

The revision states that for the purpose of tests, not less than five bricks shall be required for each investigation. In general, two samples of five bricks each shall be tested for every 100,000

bricks contained in the lot under consideration. Where the total quantity exceeds 500,000 bricks, one sample of five bricks from each 100,000 bricks shall be accepted. An identical sentence was introduced in the standard specifications for sand-lime building brick.

Ready-Mixed Concrete

Several additions were incorporated into the standard specifications for ready-mixed concrete. With reference to mixing times, it is specified that when the central mixing plant is used for complete mixing of concrete to be transported in a non-agitating truck, the minimum mixing time for mixers of 1 cu. yd. capacity or less shall not be less than one minute, for larger capacities of mixers this mixing time shall be increased at the rate of 30 second or more for each cubic yard, or fraction thereof, additional capacity.

Two new sections were incorporated as follows:

20. Agitation*: When mixed concrete is transported in a truck mixer or an agitator, the size of batch shall not exceed the rated capacity of the equipment for agitation as stated by the manufacturer, and as stamped in metal at a prominent place on the equipment. The concrete shall be agitated at the rate specified by the manufacturer as agitating speed.

21. Shrink-mixing*: When a truck mixer, or an agitator provided with adequate mixing blades is used for transportation, the mixing time at the central mixer may be reduced to the minimum required (about 30 sec.) to incorporate the ingredients of the mixture into a mass, and the mixing completed in the truck mixer or agitator. Under these circumstances, all ingredients for a batch shall be in the central mixer and partially mixed before any concrete is discharged to the truck mixer or agitator, and the size of the batch shall not exceed the rated capacity of the equipment for shrink-mixing as stated by the manufacturer, and as stamped in metal at a prominent place on the equipment. The mixing time in the truck mixer or agitator shall be as specified for truck mixing in section 22.

Signs with Union

MONOLITH PORTLAND MIDWEST CO., Laramie, Wyo., according to local newspapers, granted a 10% wage increase in July, and signed a closed-shop agreement with a C.I.O. union.

Possible Salvage

EMPIRE LIMESTONE CO., Buffalo, N. Y., abandoned operations at its quarry at Shirkston, Ont., several years ago, and the quarry filled with water, submerging rails, pump, and two locomotives. Recently a professional diver has been exploring the bottom with the idea of salvaging much of this equipment, now in 42 ft. of water.

* For truck mixers and agitators of the revolving drum type see tentative standards and recommended practices for truck mixers and agitators of the revolving drum type of the National Ready Mixed Concrete Association.

Control Fight Ends

GYPSUM, LIME AND ALABASTINE, CANADA, LTD., stockholders voted recently, 187,612 shares to 158,306, to retain the present board of directors. There has been an open battle, with much publicity, for several months during which R. E. Haire, former head of the company, has attempted to regain control.

Addition

UNITED STATES GYPSUM CO., Port Clinton, Ohio, Gypsum plant is being enlarged to provide greater facilities for the manufacture of "Acoustone," the company's brand of acoustic plaster.

Company Union Wins

AMERICAN GYPSUM CO., Port Clinton, Ohio, employes voted 90 for the company union and 79 for the United Automobile Workers of America, at an election ordered by the National Labor Relations Board, as the result of an agreement reached after a five-weeks' strike. A total of 173 votes were cast, 4 being disputed and thrown out.

Wage Increases

UNITED STATES GYPSUM CO. and AMERICAN GYPSUM CO., Port Clinton, Ohio, increased wages of employes July 1, according to an agreement made last spring when a 10% increase was made effective in April. The latest increase is said to be 5c per hour with proportionate increases for piece workers. The minimum hourly wage is now 60c, the highest in the history of the local industry. There have been three wage increases here since December, 1936.

Fatal Accident No. 99999

INDEPENDENT GRAVEL CO., Joplin, Mo., lost the foreman of its Phoenix plant, June 28, Elmer W. Cummings. Mr. Cummings was running beside a 60-ton loaded freight car with a block of wood to brake the car, and either lost his balance or fainted and fell under the wheels.

New Plant

G. G. HILL, Dexter, Mo., recently began operations of a new sand and gravel washing and screening plant primarily to furnish ballast for the Cotton Belt railway. It is powered by a 100-hp. Diesel motor.

New Enterprise

AGRICULTURAL LIME CO., Jackson, Mich., has been organized to produce agricultural limestone and commercial crushed stone. The new company is a partnership of Zora Gould, P. M. Gould and John Cox, Detroit, Mich., and E. M. Fitzsimmons, Jackson. Mr. Fitzsimmons is superintendent. Production was started July 1. The quarry is the former site of a lime plant.

June Statistics

PORTLAND CEMENT INDUSTRY in June, 1937, produced 11,163,000 bbl., shipped 12,649,000, and had in stock at the end of the month 24,015,000. Production in June, 1937, showed a decrease of 1.9% and shipments an increase of 1.0% compared with June, 1936. Stocks at mills were 24.6% higher than a year ago. The total production for the first half of 1937 amounts to 54,008,000 bbl., compared with 43,529,000 in the same period of 1936, and the total shipments for the first half of 1937 amount to 52,535,000 bbl., compared with 47,223,000 in the same period of 1936. The statistics here given are compiled from reports received by the Bureau of Mines from all manufacturing plants.

In the following statement of relation of production to capacity the total output of finished cement is compared with the estimated capacity of 160 plants at the close of June, 1936, and 1937.

RATIO (PERCENT) OF PRODUCTION TO CAPACITY

	June		May	April	March
	1936	1937	1937	1937	1937
The month.....	52.3	52.8	53.2	48.8	38.6
The 12 months ended.....	32.7	47.8	47.9	47.6	47.0

Developing Gypsum Deposit

KEMP ROSS is developing a gypsum quarry at Booher Lake, near Riverside, Okanogan County, Wash., and trucking the crude rock to Seattle.

Improvements

FALKLAND, B.C., Canada, gypsum mine is being equipped with $25,000 worth of new machinery. The present cableway, a mile long, to the Canadian National Railway is being replaced by motor truck haulage.

Expanding

SOUTHERN STATES LIME CORP., Crab Orchard, Tenn., is reported to be planning extensive improvements which will double its capacity for making hydrated lime. N. D. Walker is president.

In Production—Rock Wool

GENERAL INSULATING AND MANUFACTURING CO., Dubuque, Iowa, began production of rock wool at its new plant in the old Milwaukee railroad shops on June 15. Natural argilaceous limestone is the raw material. Coke-fired cupolas do the melting and steam is used to blow the molten material. Patented annealing chambers are used to complete the processing.

NATIONAL ASSOCIATION *Activities*

Crushed Stone

ADMINISTRATIVE DIRECTOR BOYD has mailed out to the membership of the National Crushed Stone Association the "Manual on Uniform Cost Accounting Principles and Procedure." The price to non-members is $2 per copy. Packed into 30 pp. is information quite essential to the progressive operator. There is considerable diversity in cost-accounting methods in the industry and much good would result from adoption of a uniform system. This manual has the virtue of being brief and simply worded and its publication by the association, particularly at this time when attempt is being made to standardize labor costs, is a constructive move.

Sand and Gravel

EXECUTIVE SECRETARY AHEARN mailed copies of Charles Warner's testimony at the hearing of the joint congressional committee on the Black-Connery wage and hour bill, now before Congress to all members of the National Sand and Gravel Association. The members of the industry are of course familiar with the facts Mr. Warner presented; the object in sending it out was doubtless to show how well Mr. Warner had served the industry as a whole.

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The association's board of directors, at its recent summer meeting, decided to continue to help its members in their labor relations. Secretary Ahearn has suggested some of the subjects that might be investigated as follows:

(1) Have union agreements affected efficiency of individual employes?

(2) Detailed classifications of employes under the three general headings—common labor, semi-skilled labor, and skilled labor. We have found that practice varies in this regard.

(3) Number of employes at different periods of year.

(4) Pay roll by months.

(5) Length of operating season of member companies.

(6) Information regarding peak-loading variations.

(7) Data on susceptibility to adverse weather conditions.

(8) Advice as to welfare plans of employers, including housing and food subsidies, group insurance plans, and pensions.

(9) Individual policies with reference to vacations, sick leaves, dismissal wage, and bonus systems.

(10) Information as to extent of employment of persons under 16 years of age in the industry, or employment of persons under 18 years of age in hazardous employments.

(11) Programs for stabilization of employment, and advice as to whether contractor-producer plants affect such programs.

(12) Advice as to any contemplated changes in rates of pay or hours of employment.

(13) Advice as to whether physical examinations are required, both when employes start to work and during the course of employment.

(14) Advice as to whether all members find it feasible to operate under double or treble shifts.

Industrial Sand

CHAIRMAN E. O. SCHNEIDER, Ottawa, Ill., of the research committee of the National Industrial Sand Association, is asking all members of the association to submit suggestions for a research program.

Lime

H. A. HUSCHKE, head of the agricultural lime department of the National Lime Association, has been very active recently in renewing contacts with the Agricultural Colleges and Experiment Stations in the East. He found interest in soil liming at an all-time high. In Massachusetts he found that the Experiment Station plots had developed a magnesium deficiency. In Rhode Island there has been a substantial increase in the use of lime on potato soils. All soils in New Hampshire are said to require lime; in one test plot the need was 8 tons per acre.

Charles P. Hoover, Columbus, Ohio, water purification engineer, who wrote the association's much prized manual on lime in the treatment of water supplies, in a paper read at the recent American Water Works Association convention, said among other things that lime made in rotary kilns is especially adapted to water softening.

Lee S. Trainor, the association's expert on construction lime, who is also secretary of the committee on lime of the American Society for Testing Materials, reports that, at the recent meeting of the committee in New York, the matter of rejection or retention of the Autoclave Method of Testing Lime for Soundness was ordered held open until December 1, 1937, to permit interested parties to submit further data and information after which a new letter ballot will be taken. The results of the letter ballot on this subject authorized at the March 4, 1937, meeting were not reported.

The accident prevention bureau of the association reports that the severity rate in the lime industry in 1936 was 3.54 per 1000 man-hours, compared with 3.82 for the cement industry, but the frequency rate was 21.07 compared with 7.55 for cement—in other words almost three times as many accidents as the cement industry had, with about the same seriousness.

Asphalt

MEMPHIS, TENN., has been selected by the Asphalt Institute for the next National Asphalt Conference. The date is the week of December 6, 1937.

Ready-Mixed Concrete

NATIONAL READY MIXED CONCRETE ASSOCIATION has accepted as members Le Soliditit Francais, Paris, France, and Winstone, Ltd., Auckland, New Zealand. Thus is the fame and reputation of the association becoming world-wide.

At its recent meeting in Buffalo, N. Y., the executive committee adopted a new graduated scale of dues as follows: 1½ mills per cubic yard of production with a minimum of $20 and a maximum of $150. Associate membership dues (machinery manufacturers, etc.) were made $50. Personal memberships of engineers, etc., were set at $25.

Rock Asphalt

KENTUCKY ROCK ASPHALT INSTITUTE has issued a booklet "Kentucky Rock Asphalt—Specifications and Designs for Its Many Uses in Construction and Maintenance." The booklet contains 32 pp., is well illustrated and should prove interesting to all rock products producers as a sample of effective promotional literature.

• Reported •

By Geo. D. Roalfe

Los Angeles

WEST COAST ACTIVITIES

NEW SILICA SAND PLANT IN NEVADA

THE SILICA SAND FOUND in the deposits of the Arden Silica Co. occur in the form of crystaline sandstone, exceptionally free from impurities. The deposits are located approximately four miles north-westerly from Arden, a station on the Salt Lake Railway (Union Pacific System), in Clark County, Nevada.

The purity of this deposit is attributed to the water action during deposition, and it has been classed as belonging to the Mesozoic geological period. The Arden sandstones must be distinguished from the sheared and crushed pegmatitic zones found near the Pacific Coast and in the Sierra Nevada Ranges. These silica bodies, derived from the pegmatites, occur as unconsolidated masses containing a high percentage of oversize particles and require considerable crushing to bring them down to commercial grades. They also contain sufficient amounts of feldspar, kaolin, biolite and muscovite to render their purification not only costly but difficult.

The property operated by the Arden Silica Co. includes seven claims known as the Silica and Scorpion groups. They cover an area of 220 acres, have an exposed face of 250 ft., and extend for a total distance of 3¼ miles. The geologist for the company has estimated that the deposit contains at least 25,000,000 tons of marketable material.

This property was opened in 1930 by Harry E. Blood operating as an individual. The material is somewhat consolidated and required shooting. Drilling was accomplished with a single Cochise wet jack hammer. A 110-cu. ft. Ingersoll-Rand gasoline driven compressor was used to provide the necessary air. All steel was dressed at the site by hand. Shooting was done with 40% gelatin explosives.

The original plant consisted of an 11-in.x18-in. Universal jaw crusher, an Isabell 3-ft.x5-ft. 6-in. double-deck, vibrating scalping screen and a homemade set of double rolls, 14 in. in diameter by 28 in. in length. These units were grouped around a small timber bunker and were belt driven from a 75-hp. Holt gasoline engine. The Isabell vibrating screen acted as a scalper as well as a sizing screen. This plant produced only an unwashed sand which was sold primarily to the steel foundries around Los Angeles.

Adren Silica Company's deposit in southern Nevada, showing stratification and the original plant in lower foreground

The picture of a portion of the deposit clearly shows the stratified character of the sandstone. In the lower portion can be seen the original plant and the opened quarry face.

After operating more than five years Mr. Blood formed the Arden Silica Co., a California corporation, in 1936, with an authorized capital of $150,000. Since becoming incorporated a new plant has been built.

The location selected for the new plant is on a spur of the Salt Lake Railway, at Arden. This site not only provides direct loading facilities to railroad cars by means of a portable belt conveyor but also brought the operations close to an adequate water supply. Southwestern Nevada lies in an arid section and the company was fortunate in being able to obtain the necessary supply by purchasing it from the Salt Lake Railway.

No change has yet been made in the quarrying operations. Loading is still by hand labor and haulage by one truck. Plans for the immediate future call for the increase of the transportation fleet to three trucks. When this is done it is proposed to acquire a 1-cu. yd. gasoline- or Diesel-powered Caterpillar shovel. The old plant at the deposit will be entirely removed.

The new plant is now sufficiently complete to permit preparation and shipment of steel foundry sand. It consists of a timber truck receiving hopper, with a live capacity of 12 tons, into which the raw material from the quarry is deposited. This is fitted with grizzley bars spaced 2 in. in the clear. The oversize material is fed directly into the Universal 11-in.x18-in. jaw crusher, moved from the original plant. The duty on the crusher is not excessive as from 50 to 75% of the sandstone breaks down to sand sizes after shooting.

At present, the product of the jaw crusher and the through materials from the receiving bin are combined and fed to a new vibrating scalping screen. The oversize materials from the vibrating screen are passed through the rolls described above, also from the old plant. The product of the rolls again is fed to the scalper, the throughs of which are

fed into the boot of a bucket elevator 57 ft., center to center, filled with 4-in. buckets and enclosed in a steel housing. The bucket elevator discharges on to the Isabell vibrating screen previously described. This screen has the upper deck fitted with No. 18 mesh wire cloth and the lower deck with No. 35 wire mesh cloth. The products of this sizing operation are at present stored in a 60-ton hopper bottom bunker. An additional storage unit has been planned and will be constructed in the immediate future. From the storage bin the screened sand is fed by gravity to the first of two screw washers which are installed in series. Each of these utilize a 14-in. diameter screw 14 ft. long. The second of the screw washers discharges the washed product directly to an 18-in. belt conveyor for transporting to the drain bins for finished material. The present capacity of finished storage bins is 125 tons, and the present enlargement program contemplates additions to bring the total finished storage capacity to 500 tons. An additional 75-hp. Holt engine is installed and all units are belt driven.

While materials from this deposit have been sold in increasing quantities in the past, substantial increases in sales are expected by the officers of the company to follow the introduction of washing. Tests on material produced by this plant indicate that the product will be sufficiently lime free to be acceptable to the entire steel foundry trade. Considerable amounts of Ottawa sand are still being used in the Los Angeles area. Due to the marked advantage in freight rates, the Arden Silica Co. should be able to secure a larger proportion of this market. None of this material is at present being shipped to the glass trade. Recent tests indicate that the dual washing reduces the iron content Fe_2O_3 to 0.03%. This should enable the company to invade the glass sand market now being supplied largely from Belgium on a duty free basis. Washed sand is at present produced at a rate of 6 tons per hour and on completion of the improvements now under way will be doubled.

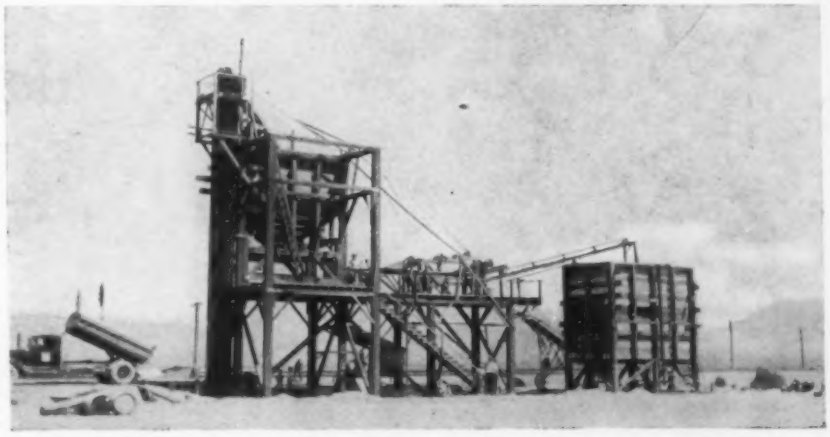
Receiving end view of new plant truck dump in immediate foreground

Enters Seattle Market

H. A. Bechtel & Co., Renton, Wash., who started production of sand and gravel with a new plant last January, have entered the Seattle, Wash., market and it is reported will establish a Seattle sales office.

In Production

Dunlap Co., Oklahoma City, Okla., has begun production of crushed and pulverized limestone at Marble City, Okla. Guy Lawrence is superintendent.



New plant during construction—all described units readily visible

Leases Quarry

Charles Leimer, Jackson, Mo., has leased the quarries of M. A. Short, one mile north of the city, and will crush limestone for agricultural and commercial purposes.

Light-Weight Blocks

Tennessee, Arkansas and Mississippi Concrete Products Co., Brownsville, Tenn., has placed on the market a new light-weight building unit made of blast-furnace slag under the trade name "Tampico" blocks. The plant also makes concrete pipe. Randolph Young is superintendent.

Cast-Stone Contract

E. J. Rees Cast Stone Co., Dover, Ohio, has been awarded the contract for all pre-cast interior stone to be used in remodeling St. John's Evangelical Church, Dover. Cream marble aggregate from Tate, Ga., will be used.

Wages Raised

Queen Anne Sand and Gravel Co., Washington Sand and Gravel Co., and Mutual Materials Co., all of Seattle, Wash., were tied up five days in June by a strike called by the Street Pavers' Union of which their employes had become members. The men asked $1 an hour for a 33-hour week for common labor. They were getting 75c for a 48-hour week. A counter proposal was made by the companies of 85c and a 44-hour week. A compromise settlement was made for 90c and a 35-hour week.

Redesigned To Make Less

Nickel Plate Sand and Gravel Co., Erie, Penn., is reversing the process so familiar to American producers — the process of constantly trying to grow bigger and bigger. Instead it is redesigning and reconstructing its plant to produce less with greater efficiency. The company officials have wisely decided the plant was originally designed for greater capacity than present-day needs or prospects, and that it can not be operated efficiently and profitably at part of this capacity. Hence, they are building a plant to produce about 400 cu. yd. daily.

House Organ

Waukesha Engineering Record is the name of a new house organ of the Waukesha Motor Co., Waukesha, Wis.: vol. 1, no. 1 is dated June, 1937. It is designed to show interesting applications of the company's gasoline and oil engines.

Hobbies, Foibles and

Personalities of Rock Products' Men

H. E. Millard of Annville, Pennsylvania

ONE WAY to "get under the skin" of Harry Millard, Annville, Penn., lime manufacturer, is to have a real interest in horses and Chesapeake Bay retrievers. Those are his hobbies and a part of his business. Big Chief, his champion jumper, and other horses from his stables, have national reputations and have won many prizes in horse shows at Devon, Penn., Atlantic City, N. J., and Madison Square Garden, New York City.

Business is combined with pleasure, as Mr. Millard rides forth on one of his horses in the early morning hours to inspect his extensive quarry operations. By riding deep down in the quarries, every operating detail is brought to his closest attention. In fact, he even rides into the quarry offices. Certainly his stables, colored grooms and the barriers and bridle paths scattered over the countryside lend the atmosphere of a Southern plantation.

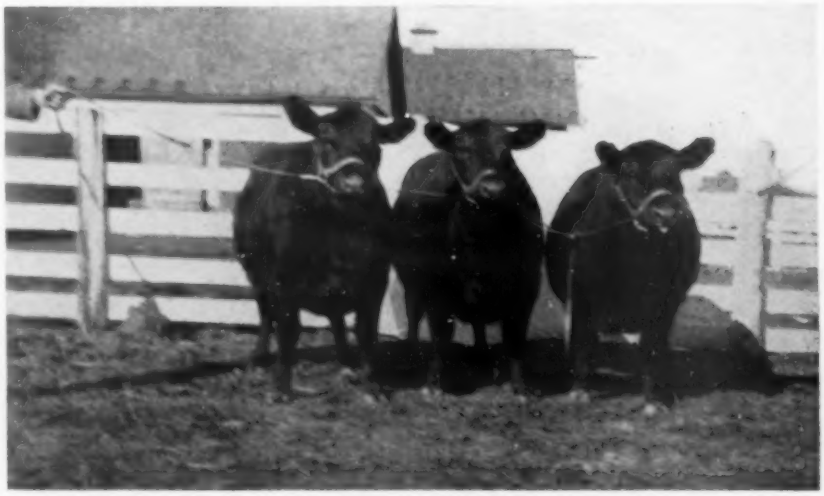
Some 5000 to 6000 acres of land were purchased years ago in the Lebanon valley, under which is high calcium and dolomitic limestone. None of this land is allowed to go to waste. Around the quarries extend fields of grain under cultivation, and pasture lands are dotted with a fine breed of Angus cattle. Grain is harvested and made into flour in Mr. Millard's 100-bbl. flour mill near the quarries. As for the cattle, they, too, are regular blue ribbon winners in state fair competitions.

Mr. Millard raises and trains hardy Chesapeake Bay retrievers, as another hobby, and for duck hunting on his own 500-acre hunting preserve near Atlantic City. As a skeet and trap shot, his reputation is established as a man who seldom misses. These are but a few of his many outside interests.

For one who is a foremost crushed stone and lime producer, it is remarkable how he finds time for all these enterprises and diversions; yet he enjoys life thoroughly. Business and pleasure go hand in hand, and not a minute of the day is wasted.

H. E. Millard, his daughter and grandsons are all devotees of horseback riding

Mr. Millard astride "Big Chief," nationally-known jumper



A group of prize-winning Angus cattle at the Harrisburg, Penn., state fair

Concrete Products
Cement Products
TRADE MARK REGISTERED WITH U. S. PATENT OFFICE

Artists, Artisans and Profitable Art

PART of the United States Government's relief program is directed toward maintenance of unemployed "artists" —a goodly percentage of whom appear to be of oriental origin. Artisans would be a more correct name for most of them. But there are legitimate fields for exercise of their talents. If some of them would have enterprise enough to turn their talents in the direction of those shown in the picture below, these relief artisans probably could find many customers among American "economic royalists," and not have to exist on charity of taxpayers.

Rebuilding Main Street...

IS A JOB FOR

CONCRETE MASONRY

Watch the small commercial building market! It's coming back fast, and untold thousands of new stores, garages, banks, and neighborhood "business corners" will soon be built as communities expand.

For this class of building concrete masonry has everything—firesafety . . . permanence . . . low cost . . . and a surprising new and untold *beauty* story! These pictures give just a glimpse of what you can do, largely with standard units. Now is the time to line up architects and builders who have new ideas, and go after this hot market.

PORTLAND CEMENT ASSOCIATION

Dept. 8-45, 33 W. Grand Ave., Chicago, Ill.

●

Three attractive buildings at Orlando, Fla. Designed by Raymond C. Stevens. Built by Kiehl & Stevens. Concrete masonry supplied by Pittman Builders Supply Co. and Newell Block Co.

Lower left view shows one of numerous recent examples of concrete masonry at Fort Worth, Texas. Built by C. S. Radford. Concrete masonry furnished by Chase Building Products, Inc.

30 12-Cu. Yd. Trucks Make Stone Deliveries And 10 Mixer Trucks Deliver Concrete

Latest type of truck mixer

KINGSTON TRAP ROCK CO., Kingston, N. J., a three-year old concern, has enjoyed a tremendous volume of business since the stone plant began production, and this year has expanded for still greater production. The company also operates a general contracting business, from which there is considerable demands for stone.

The company operates a fleet of trucks for delivering stone to the jobs that is probably unequalled for size anywhere in the United States. Thirty 6-cyl. White trucks, each equipped with 12-cu. yd. Universal bodies (Fitzgibbons and Crisp Co., Trenton, N. J.) and hydraulic end dumps, cover the entire state of New Jersey and haul stone direct into metropolitan New York. Each truck has ten wheels to accommodate 12-cu. yd. of stone.

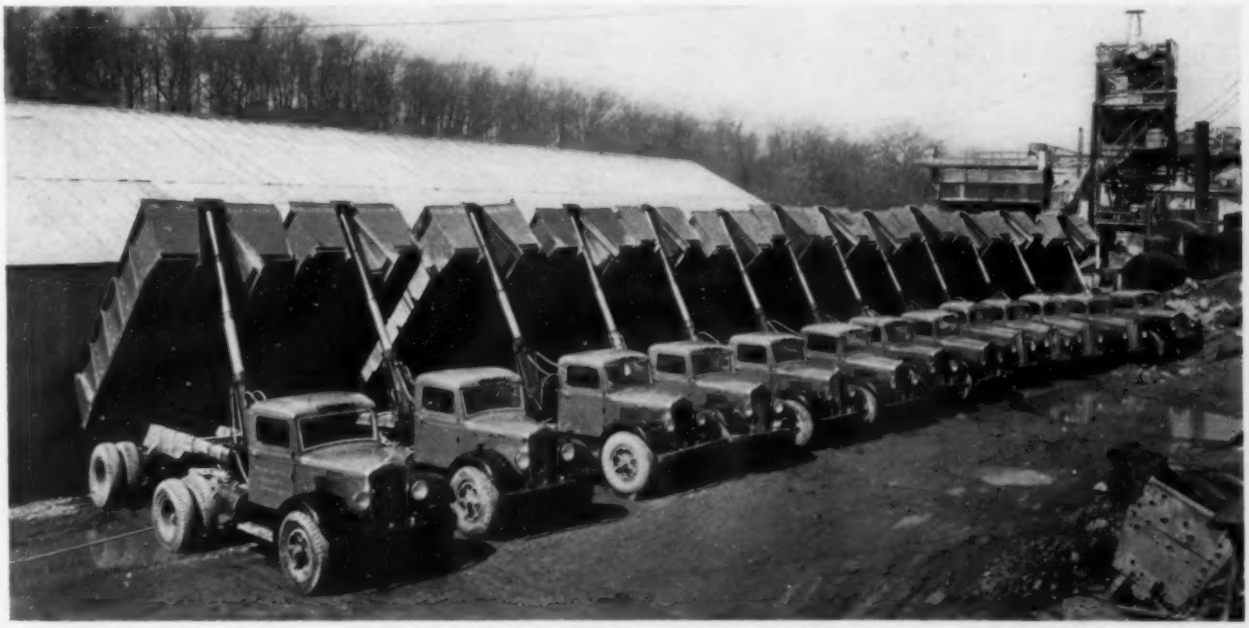
A batching plant of 400-ton capacity is being constructed for batching out ready-mixed concrete and deliveries are now being made within a 25-mile radius of the plant. Deliveries are being made in the largest capacity truck-mixers yet placed in this country. A fleet of ten 7-cu. yd. Jaeger trucks is to be operated, some of which have already been delivered. The trucks are equipped with the same size and type trailers as are used on the 12-cu. yd. stone delivery trucks so that either type body may be used.

New Enterprise

C. P. BECKER AND LEON NEELY, McCarney, Tex., have recently completed a plant to supply Crane, Ector and Ward counties with "Lay-More" concrete building tile, or block. They produce their own sand.

Adds Service

RINKER ROCK AND SAND CO., West Palm Beach, Fla., has added a lumber department. Many lumber yards have added sand and gravel retailing, but a sand and gravel and ready-mixed concrete producer adding a lumber sideline is unusual, but logical.



Part of a battery of trucks used by the Kingston Trap Rock Co. to haul stone all over the state of New Jersey

California Pumice and Pumicite Made into

CONCRETE BUILDING UNIT—"PUMITILE"

At Jourdan Concrete Pipe Co., Plant, Fresno, Calif.

By GEO. D. ROALFE

PUMITILE is the name given to a concrete unit manufactured by the Jourdan Concrete Pipe Co., at Fresno, Calif. The unit is distinctive owing to the use of pumice and pumicite exclusively for coarse and fine aggregates.

Pumice and pumicite are mined from a deposit on the south side of the San Joaquin river near Friant. This area has received considerable attention lately as it is in the vicinity of this deposit that the Friant reservoir is to be constructed by building a dam across the San Joaquin river, creating a major storage unit in the Central Valley water project of California. The deposit occurs in a dome shaped body built up of nearly horizontal layers. The gradation varies widely in the successive layers, some predominating in granular particles, others composed almost exclusively of pumicite. This differentiation in the layers has greatly facilitated mining operations.

The material is generally classed as a rhyolitic lava. Pumice and pumicite, while they are very similar chemically, vary structurally. Particles of pumice occur with diameters up to ¾ in. The pumicite, however, is of such fineness that more than 50% will pass a No. 325 mesh sieve, as mined. Both have a pink cast and are very light. An average weight of the pumice being approximately 50 lb. per cu. ft. Considerable quantities of this pumicite have been used in southern California as an admixture and have given satisfactory results from placing, stripping, and strength standpoints.

The units are manufactured with a Flam vibrating machine producing three 8-in., four 6-in. or six 4-in. units at each molding operation. The molded units are discharged on to pallets and cured in the yard in a manner similar to any ordinary precast concrete product. The regular mix consists of one sack of cement, 6 cu. ft. of graded pumice and 20-lb. of pumicite mixed with relatively large amounts of water to produce a very wet mix. The resulting pummice concrete, when cured, weighs from 80 to 90 lb. per cu. ft., as contrasted with the design weight of ordinary aggregate concrete of 150 lb. per cu. ft.

J. W. Hall's eight-room home in Fresno, Calif.

Leslie H. Clark's residence, Fresno, Calif.

Pumitile are produced in three standard sizes, all are 12 in. long and 3⅝ in. high and 4 in., 6 in., and 8 in. wide. With a ⅜-in. mortar joint they lay three high per vertical foot of wall. The sizes conform to the standards approved by the National Bureau of Standards for concrete masonry units.

Average compressive breaking

strength on 12-in.x 8-in.x 3⅝-in. units with two openings 3-in.x4-in.x3⅝-in. is 1306 lb. per sq. in. on the gross cross-sectional area. These units showed an average weight of 13½ lb. per cu. ft. Fire tests on individual units at 1800 deg. F. disclosed no apparent failure. Heat conductivity tests on 8-in. and 12-in. Pumitile walls gave coefficients of 0.31 and 0.27 per deg. F. per sq. ft., as compared with coefficients of 0.52 and 0.38 for brick masonry walls of the same nominal thickness. The units have considerable acoustical value and can be readily sawed or cut.

The Jourdan Concrete Pipe Co., makers of these units, also manufactures a full line of concrete pipe, and in connection with the sale of its Pumitile units is manufacturing a line of precast reinforced-concrete joists of standard sizes. While Pumitile has been on the market since 1930 it is only lately that a revival of building in the San Joaquin Valley has stimulated its rapid acceptance. The average annual variation in temperature in this valley is 100 deg. F. A careful check of three buildings constructed of Pumitile over a three-year period gave an average internal variation of only 35 deg. F. This benefit coupled with freedom from the danger of termite invasion facing many frame structures, has led to their recent use in variety of structures.

State Forestry Department headquarters, Visalia, Calif.

R. M. Riesner's home, Visalia, Calif.

The residence of J. W. Hall, Fresno, was constructed early in 1933. It has eight rooms with a floor area of 1850 sq. ft. and a large basement with play room. The detached two-car garage in the background has an upper story for servants quarters. Walls in both buildings are of 8-in. Pumitile, the entire exterior being painted white. Three of the rooms have a paint finish directly on the tile wall, the others are plastered. All floors are hardwood and the roof is clay tile. The complete cost of this attractive home is $9,000.

In 1934 the California State Forestry Department erected a headquarters building at Visalia. All exterior walls were built with 8-in. and interior walls with 6-in. Pumitile. The building containing 2400 sq. ft. of floor space includes two offices, barracks, kitchen, dining room and a large garage and repair shop. The floors are of concrete and the roof is frame and composition. This structure cost $8,000.

An interesting type of commercial building is the packing house of the Exeter Citrus Association, Exeter, which was completed in September, 1935. Beside the main room for fruit packing, this building contains a large box storage and a spacious office. The floor area is 214 by 110 ft., with a reinforced-concrete basement, 150 by 100 ft. The roof is supported on heavy timber columns. The walls are of 6-in. Pumitile fastened with metal ties to the timbers. The Pumitile walls are plain inside and out, except for the office, which is plastered. This structure cost $35,000 complete.

These typical examples of Pumitile buildings are evidence of the resourcefulness of H. W. Chutter, manager of the Jourdan Concrete Pipe Co., in creating a market for a new concrete product.

Strike—Quits!

DOLCITO QUARRY CO., Tarrant City, Ala., has quit operation and written its plant off the books, according to the *Birmingham* (Ala.) *News*. I. C. Beatty, president of the company, announced his decision at a joint meeting of management, the employes and government and state representatives June 29.

The company was organized in 1907. It employed about 100 men who recently organized into the International Union of Mine, Mill and Smelter Workers, demanding a contract and increased wages.

"We have lost money for years," Mr. Beatty told the union committee, "and have wanted to close the plant. This we would have done long ago except for the resultant hardship on the employes.

"Now, our decision has been made for us. We will fence in the property, and build the fence directly across the railroad spur. The plant is definitely and permanently closed.

"The men can picket all they please if they are willing to lease the ground necessary for that purpose. What they do is no longer of any concern to us."

The plant had been idle a month because of a strike.

Southern Products Manufacturer Demonstrates

SUCCESS IN SPECIAL PRODUCTS

Stone-Tile and Supply Co., Roanoke, Va.

A GOOD MEASURE of the success of the Stone-Tile & Supply Co., Inc., Roanoke, Va., one of the outstanding concrete products concerns in the South, can be attributed to the important part which special products play in its every day business. Specials of all shapes and designs, whether they be tapered, circular, elliptical or saw-tooth, are manufactured, not as a "necessary evil" of the concrete products business, but as a regular part of the manufacturing routine, for which plant space has been provided and special facilities have been allotted.

In fact, the business itself is founded on the theory that every effort should be made to produce the products fulfilling the architect's visualization of a beautiful structure. Whatever shape or design he specified, that is exactly the unit that he will get. The leading architects in this part of the State of Virginia need not shape their ideas, with limitations, according to what products they know can be furnished, but merely specify what they want, knowing with full confidence, that their requirements can be met.

Special products have proven remunerative to the company, in themselves, and have brought returns in the forms of orders for standard building units which might otherwise have been awarded to other concerns manufacturing competing products.

The company's business was good in 1936, when some 800,000 cinder units were sold. The first five months this year, 425,000 units varying in size from brick to 12-in. block were sold, indicating that from 1¼ to 1½ million units will be the 1937 volume of business.

Operations began in 1925, with the manufacture of "Stone-Tile," which has been discontinued and cinder concrete products are manufactured exclusively. In addition to the highly diversified line of special products, which are made to order, a complete line of regular units are manufactured.

Some of these products are as follows:

Size	*Designation*
2x8x16 in.	For furring.
3x8x16 in.	For 3-in. partition.
4x8x16 in.	For 4-in. partition.
4x8x8 in.	Half blocks.
4x8x16 in.	Solids for walls.
4x8x8 in.	Solids.
4x8x12 in.	For corners.
6x8x16 in.	For 6-in. walls and partitions.
6x8x16 in.	Two plain ends.
6x8x8 in.	Half blocks.
6x8x16 in.	Header blocks.
6x8x16 in.	Steel sash block.
6x8x8 in.	Steel sash block.
6x8x14 in.	For corners.
8x8x16 in.	For 8-in. wall.
8x8x16 in.	One plain end.
8x8x16 in.	Two plain ends.
8x8x8 in.	Half block.
8x8x16 in.	Header block.
8x8x16 in.	Steel sash block.
8x8x8 in.	Steel sash block.
8x8x16 in.	Jamb or joist block.
8x8x8 in.	Jamb or joist block.
8x8x16 in.	Solids.
8x8x12 in.	Walls and partitions.
12x8x16 in.	For 12-in. walls.
12x8x8 in.	For 12-in. walls.
12x8x16 in.	Solids.
2¼x3¾x8 in.	Cinder brick.

Among the other cinder concrete products regularly manufactured are 2-in., 3-in., 4-in., 6-in., 8-in. and 12-in., precast reinforced cinder concrete lintels; 2-in., 3-in., 4-in., 6-in., 8-in. and 12-in. ashlar design cinder block; precast joists and precast roof and floor slabs.

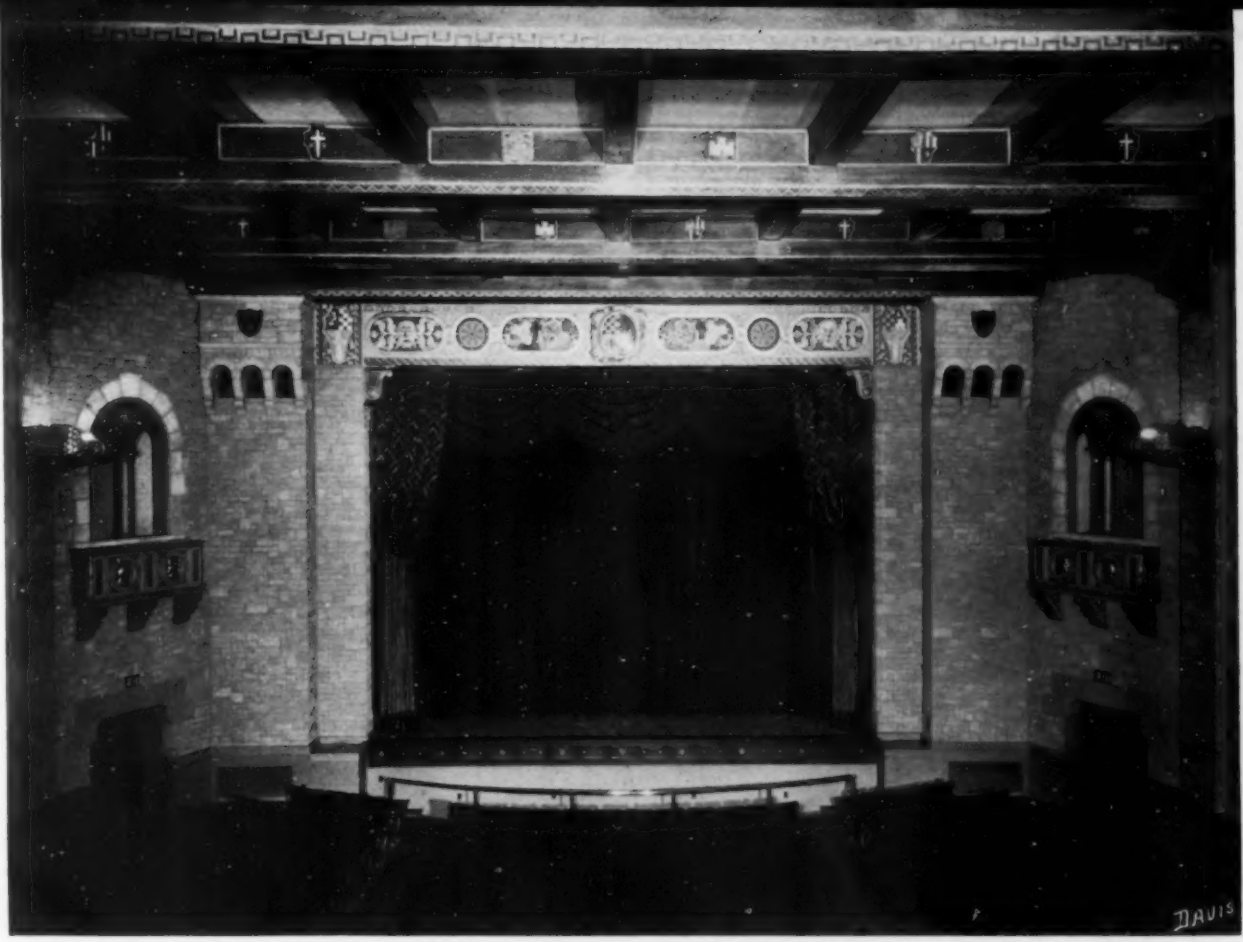
Specially Prepared Aggregates

The plant has a daily capacity of 6500 cinder block. Hand-cast units are made in the open.

The method of crushing and handling cinders is to be revised and modernized shortly. At present, cinders are crushed in a New Holland hammer mill followed by a New Holland double-roll crusher. The crusher throughs are elevated to a screen, the fines going to storage and the oversize returning to the crushers.

The mixing floor is elevated above the four Anchor block machines. Sized cinders are discharged to a 32-cu. ft. Anchor mixer by a skip hoist. The

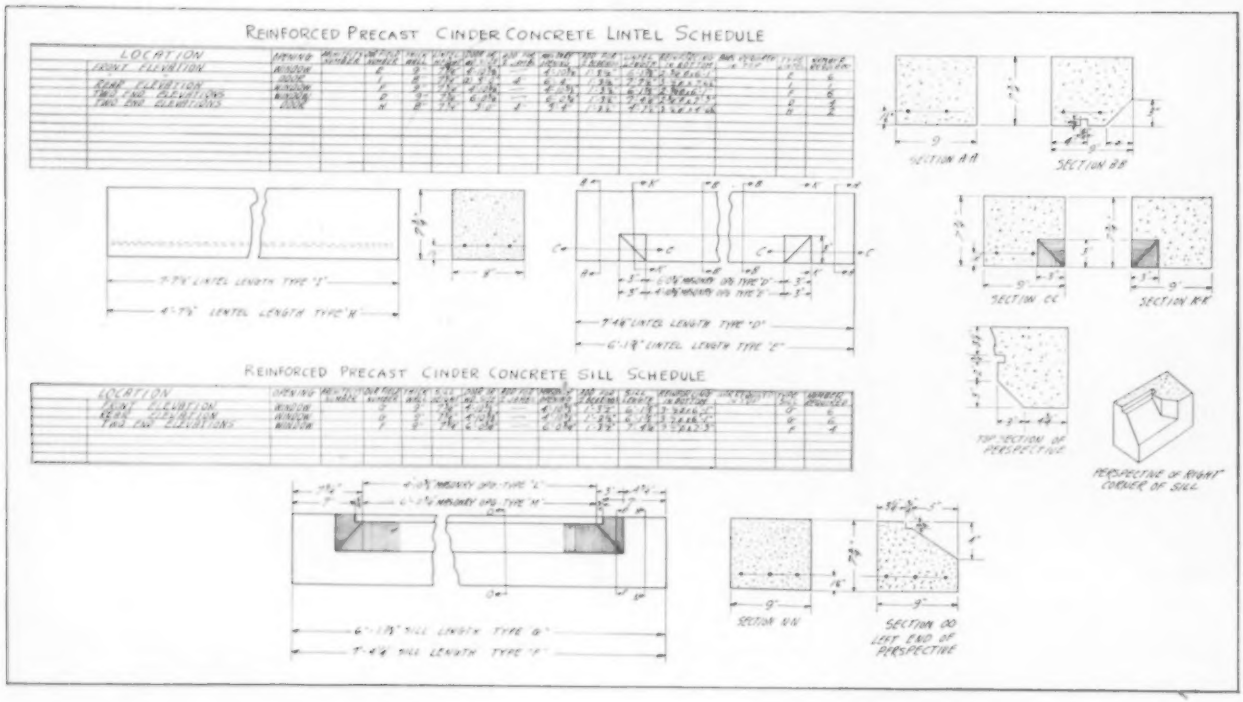
Pinehurst Inn Service Station, Roanoake, Va., showing regular cinder concrete blocks



Grandin Theatre showing 8-inch cinder block back up—no special acoustical material except ceiling

mixer is readily moved on rails spaced 8 ft. apart, so that it may discharge to either of the four hoppers serving each block machine. After a day's cure in the kilns (10), block are air cured 28 days in the open before delivery is made. Usually the equivalent of 80,000 to 150,000 8-in. units are kept in stock. Special units are cured 14 days in the

Interior of the Virginia Maid Hosiery mills employes club house where 8x12-in. exposed cinder block was used



yard, using high early strength cement.

Some of the simpler designs of special units are machine-made. Precast joists, in 8-in., 10-in. and 12-in. depths are manufactured in gang molds on a vibrating table. Joists are made with graded stone sand for fine aggregate, using cinders for coarse aggregate.

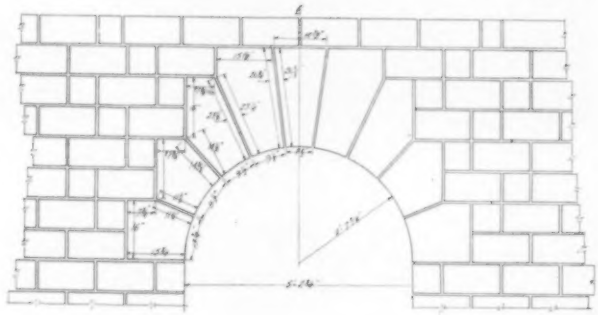
Service Important

The company operates five International trucks, of from 4½- to 10-ton capacity each, and hauls over a 125 mile radius.

A number of outstanding structures have been built of cinder block in this area the past few years. Among them are 15 modern theatres and swimming pools, auditoria and municipal buildings. A large volume of sales is for backup purposes. The company now has an order for a large high school building in Richmond, Va., requiring 50,000 sq. ft. of cinder concrete units, ashlar pattern in thicknesses of 2 in., 3 in., 4 in. and 6 in. for furring and for all interior partitions.

Six salesmen are employed, four of whom are constantly in the field, selling the various products, uncovering new sources of business and functioning in the capacity of service men. After one of these men sells a job, and construction is under way, he makes repeat calls to assist in any way, to see that the products are satisfactory and that proper use is being made of them.

The company's complete engineering and drafting department is prepared to give valuable service to architect and builder, in the form of plans, working drawings and setting up schedules. Each special unit is handled as a problem in engineering and is accurately designed to exact dimensions.



Some specifications for unusual cinder blocks

Oftentimes units to make up an intricate architectural design are designed in advance by the engineers and submitted to the architect; and even suggestive designs are engineered to show him what variations and possibilities may be applied on a particular job. All such units are made up in the plant according to accurate working drawings.

Tests Assure Quality

A complete testing laboratory is maintained to aid in the manufacture and control of a quality product. Here, equipment is available for compression testing, moisture tests and others to which concrete is ordinarily subjected.

The company uses the service of the Underwriters' Laboratories and is at all times under their supervision and control. Underwriters' certificate of approval is furnished for all jobs and strength tests, cinder tests, tests showing combustible materials are made by their own organization regularly insuring customers of a uniform and properly made masonry unit by a nationally known organization.

Machine parts and equipment repairs are made in the company's well-equipped machine shop.

More Service

In addition to the manufacture and sale of cinder concrete products of all types, a complete line of building supplies, much of which are used as accessories in construction in which cinder block are used, are carried for the convenience of customers. Among these supplies are metal windows, reinforcing steel, metal lath, steel grating, metal products, water-proofing materials, asphalt products, glass brick and overhead doors.

In conclusion, it might be said that service, a quality product and facilities

General view of plant of the Stone-Tile & Supply Co.

for manufacturing anything in cinder concrete have combined to place concrete products in the big business class in Roanoke and southwest Virginia.

Light-Weight Blocks

CHOCTAW CULVERT & MACHINERY CO., Memphis, Tenn., has recently started manufacture of "Tuff-lite" blocks, made of steam-blown slag aggregate.

Tile Contract

THOMAS CONCRETE TILE CO., Ada, Okla., is reported to have made a contract with the city commissioners to rent its plant to the city to operate with WPA labor to make approximately 2500 ft. of 15-in. concrete pipe or tile, at $1000. This would give the company 40c per ft. for the use of its equipment. The selling price of the tile made by the company was $1.55 per ft.

Concrete Brick

QUARTZITE STONE CO., Lincoln, Kans., has begun production of 20,000 concrete brick per day, using screenings from its crushed stone plant. The brick are made with various colored faces on a "Dunbrik" machine. It is reported a single order for 300,000 brick was received for the new federal government building at Salina.

New Operation

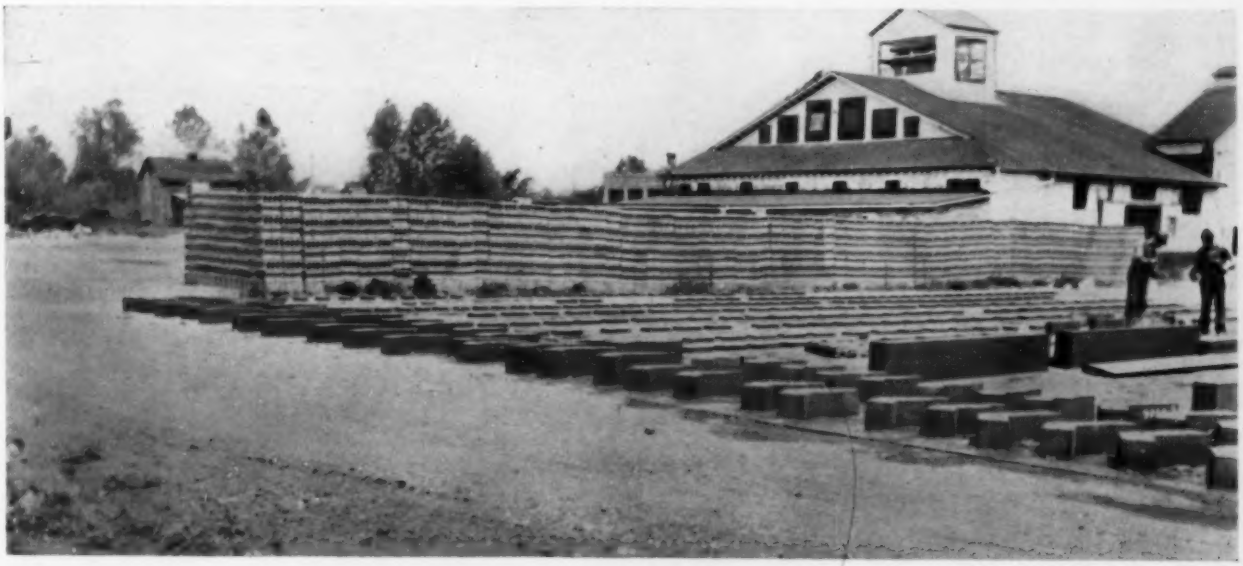
STONE-MIX CONCRETE CORP., Buffalo, N. Y., recently started manufacture of ready-mixed concrete. It is located at the foot of Katherine St. on property of the Michigan Limestone and Chemical Co., where crushed stone is brought by water from Calcite, Mich.

New Enterprise

INDEPENDENT CONCRETE PIPE CORP., 9000 Olive St., St. Louis, Mo., is the name of the company which has purchased the property 276 ft. x 785 ft., formerly occupied by the Cinder Concrete Products Co. Howard Schurmann is president.

New Plant

GENERAL CRUSHED STONE CO., Easton, Penn., has opened a new black-top surfacing plant in Smethport, Penn.



Air curing and storage of cinder block and special shapes

MERCHANDISING
CONCRETE PRODUCTS

Part 9—Burial Vaults

By H. O. Hayes

MOST UNIQUE of merchandising problems in the concrete products industry is probably that of burial vaults. And perhaps most interesting.

What complicates the situation is that it is impracticable to do direct promotion with the final buyer of vaults, for sales are made exclusively through undertakers by most manufacturers.

If a vault manufacturer is fortunate enough to have exclusive sales contracts with all undertakers in his market, little merchandising may be required. Even so, it is hazardous to neglect merchandising and promotion when competition is so keen.

But let's get a picture of the way burial vaults are sold to get a clearer picture of the merchandising problem. Common practice in burials is for the undertaker to sell all accessories, along with his services. That, of course, includes the vault. In a few isolated cases vaults are supplied by the cemeteries. Those are exceptional cases and will not be considered in this discussion.

If the undertaker is an exclusive agent you want him, as your representative, to get all possible funerals. So you plan your merchandising and promotion to direct business to him. In your advertising you may feature the names of these exclusive dealers. By playing up the high quality of your vault also you build prestige for both yourself and the undertaker. If special demonstrations are made of the quality of your vaults they may be put on under the sponsorship of the exclusive agents. Or they may be held at the undertaker's show room.

Selling Undertakers

Undertakers usually will welcome a dignified demonstration, for it provides a good opportunity to direct attention to their service. Naturally you, the vault manufacturer, benefit by having attention centered on your exclusive agent in this way.

If the undertaker handles a number of vaults, the problem is to get him to promote yours. A good profit is the strongest incentive you can offer him, assuming the vault is of good quality. So that is a first concern. Then the merchandising job is to get people to be in a receptive mood, if your vault is suggested as one of several vaults that can be had.

There are many ways to arouse public interest in your product. But first let's consider ways to win and hold undertakers as customers. Today many vault manufacturers find grave service is one of their best sales tools. This service usually includes the supplying and installation of grave grass, lowering devices and often a tent with chairs.

When undertakers do not have to bother with any details at the grave before a service—when they know that all preparations will be taken care of to their complete satisfaction, better than they would do it themselves, if possible—you will soon gain a strong foothold on the undertaker's business, and it will be hard for a new-comer to sell his product, with that element of doubt in the undertaker's mind as to whether all details will be handled with the same care and attention at the grave that you will give.

Of course, where the competition is steel vaults the undertaker has the bother of storing and handling the vault. So your service relieves him of that trouble.

While some vault manufacturers make a charge for this service, others do not. It is quite proper to make a charge, for considerable time is required to render it, as well as an investment in equipment. When a charge is made the undertaker includes that as part of his bill. The competitive situation will determine, in most cases, whether to make a charge, and what that charge should be. The adoption of grave service as part of a merchandising program merits the thoughtful consideration of every concrete vault manufacturer.

Finished Product

While of little importance from the standpoint of quality, special attention should be given to finishes offered with the vault. A dollar or two extra spent on some of the more striking paints and finishes adds many dollars to the appearance of the merchandise. And the more attractive you make your vault, the more you can get for it. Or the more sales you will make. Some manufacturers charge $5 and $10 extra for certain finishes—certainly a worthwhile extra to try for. And your undertakers will sincerely appreciate your efforts to improve the appearance of your product.

In selling new undertakers, one of the strong sales arguments you can offer is to be able to say that your vault meets the standard specifications of the American Society for Testing Materials. The standards of this impartial group are widely recognized and accepted, and no higher proof of quality can be offered than to equal or surpass these standards.

Public demonstrations to prove this point provide an excellent way to gain attention for your vault. Properly staged, such a demonstration can be made a newsworthy event that will do as much good as a paid advertisement.

At the same time that the demonstration is made, a trip through the plant may be used as a way to show the care of manufacture of your product. Particularly so if vibration is used in the manufacturing process. And an excellent story can be built around the modern manufacturing methods employed and the high quality of the product which results.

Another demonstration which is effective with the air seal type of vault is to have a pit filled with water. Then set up a lowering device so that vaults can be raised and lowered into the pit. And let people make trips to the bottom of the pit in the vault to see for themselves the principle upon which the vault functions. A number of vault manufacturers have obtained good publicity in this way.

Regardless of where the vault plant is located, a neat, attractive appearance is an asset. Neatness and close attention to details are two very important elements with every undertaker, and every employe of a vault manufacturer should be instilled with that realization. These factors are second only to dependability. Above all, deliveries must be made in plenty of time for the funeral, and a late delivery is a sure way to lose a customer.

Advertising

Other ways to win and hold good will of your customers, but second of course to dependability and grave service, are with various types of advertising.

A blotter mailed monthly to all undertakers in the immediate shipping area. Attractive calendars that will be used. Newspaper ads. (These ads should be placed near the death notices in the paper.) And billboards. All are useful in building public acceptance and demand for your product. And if these can be supplemented by effective public demonstrations, so much the better.

If your undertaker doesn't have a show room or display space it is a good idea to sell him on the idea of arranging one. In it you would want him to include a full-size vault finished in the most attractive way. It is also a good idea to have a display of alternative finishes. An excellent way to prepare such a dis-

play is on a dark, velvet-covered panel to which small plaques of concrete are attached, each with a different finish. A carefully prepared display of this type will find space in any undertaker's office.

It is also a good idea to furnish the undertaker with a small section cut from an actual vault, so that he can show his customers the excellent construction of the vault, the high quality of the concrete, and the way the vault is reinforced. Some manufacturers of vault molds have special equipment for preparing such samples. Or samples may be taken out of a stock vault.

Another good sales tool is a picture of one of your old vaults being removed from the ground to demonstrate the excellent way the vault has withstood the ground exposures. Such opportunities occur infrequently, but vault manufacturers should capitalize on them at every opportunity.

If you prepare a catalog of your vault it is a good lead to provide space for the undertaker's imprint, so that he can pass them out.

A trade mark and a good trade name for your vault are desirable, for they help identify your products and more clearly identify all of your advertising. Trademark and name should be painted on delivery equipment, so that it will add further to the value of your advertising.

While many vault manufacturers limit their operations exclusively to vaults, many other manufacturers make various sidelines. One which fits in well is septic tanks. While different forms are required, there are many similarities in the method of manufacture. And the same delivery and installation equipment can be used.

Merchandising of septic tanks may be done through dealers. Or they may be sold direct mail, or by your own salesmen who specialize in this product. In some areas very good volumes have been developed in septic tanks alone by direct selling.

Sectional Boxes

Some vault manufacturers also make concrete rough boxes. These are not sold as water-proof vaults, but simply as a rot-proof box. With these boxes the profit is limited, but where price sharply restricts the market for vaults it is sometimes possible to break through the price problem and gradually convert the market to permanent boxes—then later on to vaults.

These concrete rough boxes, also called sectional boxes, are sold direct to cemeteries, and care must be taken not to establish competition with the sale of vaults to undertakers. With judicious handling this opportunity offers interesting possibilities.

Sidelines

Still another possible sideline for vault manufacturers is a precast cooling tank for farm milk houses. Here again is a product that closely parallels the manufacture of vaults. And in a rural dairy district a well-designed and properly priced tank will find a receptive market.

A direct selling organization will prove most effective in introducing a tank of this character. It is often possible to get some help from county agents, who may arrange for a demonstration installation to which all neighboring farmers are invited.

If salesmen have both septic tanks and milk-cooling tanks to sell, an intensive house to house canvass may often be made profitable, once your product wins the approval of leading farmers and townspeople.

There are many other sidelines which can be made by the vault manufacturer. Each must decide for himself which offers the greatest opportunity. But regardless of the locality, careful attention to details that will establish the manufacturer's vault as one of highest quality, of outstanding appearance, and his service one that is both dependable and flawless will increase the sale of his vaults.

And if the fully developed market of the economic shipping area for vaults does not provide necessary volume, a careful study of supplementary products backed by a strong sales program to put them over can fill the plant to the necessary profit capacity.

Curing Concrete

CALCIUM CHLORIDE ASSOCIATION, Detroit, Mich., has issued a 4-pp. summary of recent improvements in the integral use of calcium chloride for curing concrete (Brief No. 126), which can be obtained for the asking. It includes (1) a graphic method for determining the amount of calcium chloride to be used in highway concrete for regulating the setting time according to weather conditions; (2) dry flake calcium chloride placed in the mixer skip, with aggregates and cement; (3) varying the calcium chloride content within practical limits, according to weather conditions does not affect concrete strengths; (4) integral curing with calcium chloride not only increases early strength but also increases 3-year strength. Laboratory data is quoted.

CONCRETE PAINT

TAMTEX
WATER CEMENT PAINT
in Powder Form
Waterproofs and Beautifies Concrete Products
Write for Color Card
TAMMS SILICA COMPANY
228 North LaSalle St. Chicago, Illinois

STURTEVANT

AIR SEPARATORS

213 STURTEVANTS sold on approval for Cement. Not one rejected.

"HIGH EARLY" and regular cement 1500-3300 S.S. Area.

Engineered Installations for raw or clinker show 25 to 100% capacity increase.

STURTEVANT
MILL COMPANY
HARRISON SQUARE
BOSTON, MASS.

CEMENT COLORS

CEMENT COLORS
Will not fade—extra fine and strong
TAMMS SILICA COMPANY
228 North La Salle St. Chicago, Illinois

STAR and ANCHOR COLORS
Geo. S. Mepham Corp., East St. Louis, Ill.
C. K. Williams and Co., Easton, Penn.

SPECIAL AGGREGATES

BEAUTIFUL DARK GRANITE
Samples on request.
Mica Crystal Co., Inc.
WARREN, N. H.

Improvements

ANNOUNCEMENT is made of the introduction of standard electrical units for installation in concrete products plants in connection with the Electro-Cure method of curing precast products.

Electric automatic control unit

The Electro-Cure unit shown automatically controls the current. It is made in three types, for curing 500, 1000 and 1500 blocks respectively every six hours. With the exception of special racks, this is the only equipment the Electro-Cure process requires.

It is sold by the Technical Development Corp., Detroit, Mich., which controls in the United States the Electro-Cure process.

Curing Rack

A NEW DESIGN of curing rack for concrete products has been developed by the Technical Development Corp., Detroit, Mich., in conjunction with their "Electro Cure" process (see ROCK PRODUCTS, April, 1937, p. 94).

The rack is 6½ ft. long, 5 ft. high, and 2 ft. 9 in. wide, with a capacity of thirty 8-x12-x16-in. blocks, or thirty-six 8-x8-x16-in. blocks. The uprights are 2½-x2½-x2¼-in. steel angles, the frame being reinforced by steel gussets and by steel cross members at the ends. Movable decks are fabricated of 2-x2-x¼-in. steel angles.

In the Electro cure process, the temperature of the block in the moisture-laden kiln atmosphere is stepped up by passing an electric current through the block which acts as a resisting medium, the result being accelerated curing, allowing removal of the product from the kiln in eight hours. The metal pallet on which the block rests acts as one electrode. When the first tier of blocks has been placed on the rack, the second deck is let down. A galvanized metal plate, acting as the other electrode, is attached to the under side of the deck. As the second deck is loaded, the weight of the blocks lowers the deck against compression springs at the ends. As the electrode forms contact with the first tier of blocks, the deck's settling is arrested by stops and lighter springs between electrode and deck equalize the contact with the block underneath.

Curing rack

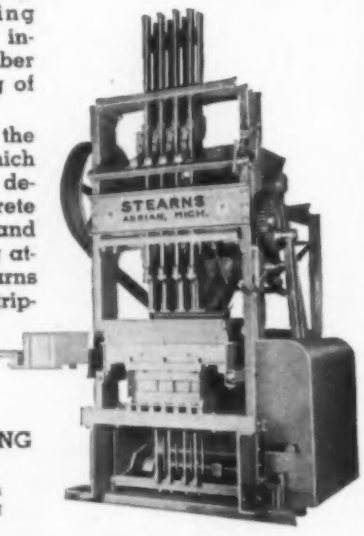
When the loaded rack is run into the kiln, electrical connection is made at the outlet plug and the brief curing process starts.

The Stearns *makes 'em all!*

Here's an automatic, *all purpose* stripper that makes plain blocks *any* size—also face block, brick, tile, headers or manhole block. It makes *'em fast, dense, true-to-dimension.* This machine with its multiple bar alternate tamping action actually increases the number of blocks per bag of cement.

We also make the Stearns Mixer which is particularly designed for Concrete Products Plants and Straub oscillating attachments for Stearns and Anchor Strippers.

Write today for bulletins.



STEARNS MANUFACTURING COMPANY
Adrian, Michigan
EUGENE F. OLSEN
General Manager

THE ADVANTAGES OF CORED PALLETS

Better Blocks
More Economical Curing
Less Block Breakage
Lower Maintenance Cost
Lower Machine Investment

"Commercial" Steel Pallets support the above statements They are made in many different styles and sizes

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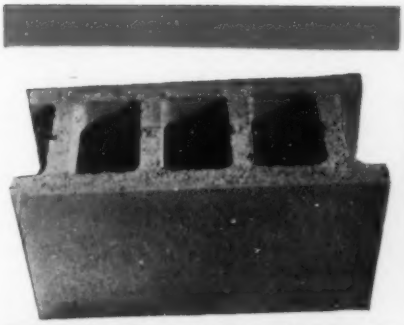
Write for catalog

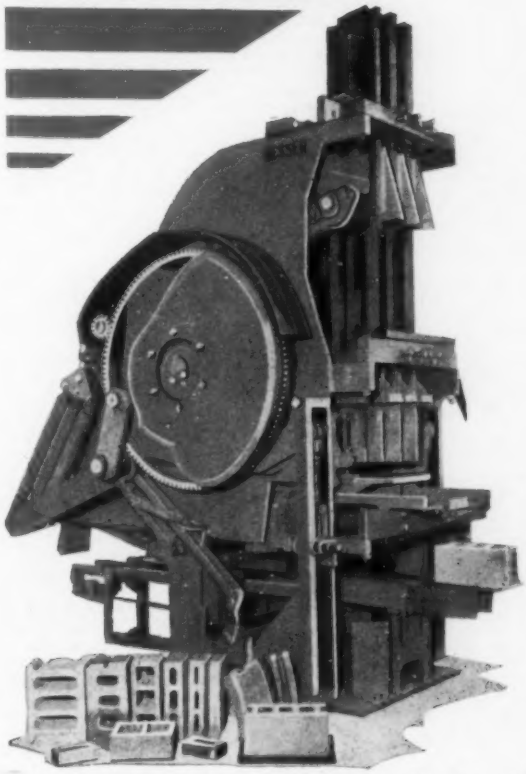
The Commercial Shearing & Stamping Co.
YOUNGSTOWN, OHIO



The New Standard *of* QUALITY

A REAL BASIC IMPROVEMENT IN CONCRETE MASONRY UNITS THAT HAS OPENED NEW MARKETS

The units with FULLY PRESSED TOP made only on Besser Plain Pallet Strippers have made the manufacture of concrete masonry units more attractive and profitable. Builders are demanding these new units, with perfectly formed tops, faces, edges, and corners. They lay up into perfectly aligned walls with uniform mortar joints with less work and more satisfactory results. They cost no more to make than the old type units.



Only ONE SET OF PLAIN PALLETS required to make all the units shown above—and any number more. The saving in pallet cost pays for a Besser Plain Pallet Stripper.

Cinder Concrete Units, Inc., Boston, Massachusetts, makes a large variety of sizes on ONE SET OF PLAIN PALLETS on their three Besser Plain Pallet Strippers. In this plant the amount saved on pallet cost more than paid for their three Besser Plain Pallet Strippers—and these machines are continuing to save money in operating costs every day.

BESSER PLAIN PALLET STRIPPERS

FULLY AUTOMATIC—3 Models—Capacities: 2000 to 4000 units per day.

SEMI-AUTOMATIC—4 Models—Capacities: 1000 to 2000 units per day.

POWER OPERATED with Hand Controls—2 Models—Capacities: 500 to 1000 units per day.

MULTI-MOLD—Hand Operated—Capacities: up to 300 units per day. For manhole blocks, brick slabs and small cored units.

AUTOMATIC BRICK MACHINES—Capacities from 10,000 to 50,000 units per day. For brick, slabs, coal cubes and other small units.

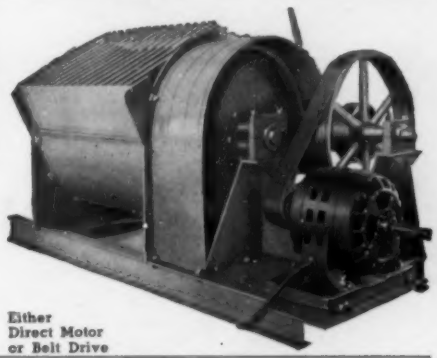
Write for Illustrated Catalog of BESSER PLAIN PALLET STRIPPERS State Production Capacity Wanted

BESSER BATCH MIXERS

Made in All the Standard Capacities—5, 12, 18, 25, 30, 40 and 50 Cubic Feet.

They Mix More Thoroughly and Wear Longer

Ask for Illustrated Catalog



Either Direct Motor or Belt Drive

BESSER MANUFACTURING CO.

COMPLETE EQUIPMENT FOR CONCRETE PRODUCTS PLANTS

Complete Sales and Service on BESSER, ANCHOR, CONSOLIDATED, IDEAL, HOBBS, UNIVERSAL, PORTLAND

208 37TH STREET **ALPENA, MICHIGAN**

EVERY CONCRETE PRODUCTS PLANT NEEDS A BESSER PLAIN PALLET STRIPPER

TRAFFIC and TRANSPORTATION

Proposed Rate Changes

THE FOLLOWING are the latest proposed changes in freight rates up to and including the week of July 17:

Trunk

36000. **Stone, crushed, and stone screenings,** C. L., (See Note 3), from Cumberland, Md., to Mingo Jct., Ohio, $1.60 per net ton, in lieu of present rate $4 per net ton.

36008. **Sand** (other than ground or pulverized), in closed cars, and sand, naturally bonded molding, in open top or closed cars, C. L., (See Note 3) from Mapleton District, Penn., as indicated in P. R. R. I. C. C. 1447, to Montreal, Que., $4.50 per net ton, in lieu of present rate $5.30.

36011. **Slag,** C. L., min. wt. (See Note 3) from Bethlehem, Penn., to Shainline, Penn., 65c per net ton in lieu of present rate 90c.

36014. **Sand** (other than ground or pulverized or naturally bonded molding) and **gravel,** in open top cars, without tarpaulin or other protective covering, C. L., (See Note 3), from Parkersburg, W. Va., to various Ohio points, rates ranging from 60c to 95c per net ton, in lieu of present rates ranging from 8c to 14c per 100 lb.

36016. **Sand** (other than ground or pulverized or naturally bonded molding), C. L., (See Note 3), to Hagerstown, Md., from Georgetown, D. C., 90c, and from Uniontown, D. C., 95c per net ton, in lieu of present rates $1 and $1.05, respectively.

36021. To cancel commodity rates on **lime,** C. L., as described in Items 2150, 2160, 2170, 2180 and 2190 of Agent A. P. Hecker's I. C. C. 213 from C. & O. Ry. and Norfolk and Western Ry. stations in Virginia to destinations in C. F. A. territory allowing class rates to apply. Reason: No present or prospective movement.

36029. To cancel commodity rate $1.35 per net ton on **roasted dolomite,** C. L., from Blue Bell, Penn., to Burnham, Penn., published in P. R. R. I. C. C. 1485. Reason: No present or prospective movement.

36039. **Stone,** crushed, slag and/or gravel, coated with oil, tar or asphaltum* in open top cars, in straight or mixed carloads, (See Note 3), from Gray, Penn., to points in Trunk Line and C. F. A. territory, the following: Rates to points on and west of the Cumberland-Cresson line on basis of I. C. C. Docket 22598 (Shaw Junction) single or joint line scale and to points east of the Cumberland-Cresson line on basis of I. C. C. Docket 25028 (Martinsburg) and P. S. C. Penn. Dockets 9114 and 9146 (Tyrone Forge) single or joint line scale.

36042. **On broken brick** having value for crushing or grinding purposes only, C. L., min. wt. 100,000 lb., from Krebs, Penn., to Beech Creek, Penn., $1 per net ton in lieu of present rate $1.65.

36043. **On crushed stone** and screenings, in straight or mixed carloads (will not include agricultural limestone or ground limestone, unburnt; fluxing stone or firestone; or stone coated with oil, tar or asphaltum), (See Note 3), from Monocacy, Penn., to Chicago, Ill., $5.60 per net ton in lieu of present 6th class rate 40c per 100 lb. Reason: To re-establish rate formerly in effect because of renewal of movement.

36050. To cancel Item 3855, Agent Curlett's Tariff I. C. C. A496, providing for 90% of 6th class rating on **dolomite,** burnt or roasted, C. L., from Kenova, W. Va., to points in Canada. Reason: No present or prospective movement.

36059. **Stone,** crushed and screenings, in straight or mixed carloads (will not include agricultural limestone or ground limestone unburnt; fluxing stone or firestone; or stone coated with oil, tar or asphaltum), (See Note 3), from Billmeyer, Penn., and Blue Mount, Md., to various P. R. R. stations in Virginia, rates ranging from $1.60 to $1.80 per net ton.

36076. **On sand, building or common and gravel,** C. L., (See Note 3), from Hudson Falls, N. Y., to Whitney Point, N. Y., $1.80 per net ton, in lieu of present 6th class rate 21c per 100 lb. Reason: Based on Lycoming scale.

36078. To cancel commodity rates on **limestone, agricultural,** published in B. & O. R. R. Tariff I. C. C. No. 22616 and 22897, from stations 4820-Moundsville, W. Va., to 10995-Rock Point, Penn., to Eastern base points and points taking same rates. Reason: No present or prospective movement.

36079. To cancel commodity rate 17½c per 100 lb. on **crude gypsum,** C. L., from Akron and Oakfield, N. Y., to stations Maybrook, N. Y., Lake Grinnell, N. J., Woodruffs Gap, N. J., Easton, Penn., published in N. Y. C. R. R. I. C. C. NYC No. 16921. Reason: No present or prospective movement.

Sup. 1 to 35894. **(A) Gypsum blocks, planks or slabs;** ground **gypsum; calcined plaster;** stucco plaster; wall plaster and **(B) plaster board,** C. L., min. wt. 40,000 lb., from Delawanna, N. J., to various points of destination in West Virginia. (A) 22½c and (B) 25c per 100 lb.

36083. **Rough quarry stone,** rip rap or rubble, C. L., (See Note 3), from Oxford Furnace, N. J., to Barnegat, N. J., $1.40, and Avon, N. J., $1.30 per net ton, in lieu of present sixth class rates.

36084. To establish switching charge of $3.15 per car between sidings of H. E. Millard, at Annville, Penn., on lime, in lieu of present rate of 38c per net ton.

36087. **Sand and gravel,** C. L., (See Note 3), from Bladensburg, Md., to various points on B. & O. R. R., Linden, Md., and west thereof as shown in B. & O. R. R. I. C. C. No. 22921, the same rates as now published thereto from Georgetown, D. C. (same tariff).

Central

51177. To establish on **lime** (calcium), carbonate of: (recarbonated waste), in packages or in bulk, C. L., min. wt. 50,000 lb., from Akron and Barberton, O., to Noblesville, Ind., 13c.

51184. To establish on **rip rap stone,** C. L., in open top cars, from Jeffersonville, Ind., to Cleveland, O., 302c per net ton. Route: Via P. R. R. direct.

51185. To establish on **agricultural limestone,** in open top cars, C. L., (See Note 3), from Marion, O., to Carollton, O., 125c per net ton.

51197. To cancel the following commodity rates from G. T. Ry. Sys. (Lines West), Tariff 312-Q, and similar rates in other individual lines' issues:

Item 1335—**Slag** (a product of iron and steel blast of open hearth furnaces), C. L., from Chicago, Ill., to Cleveland, O., 315c per net ton.

Item 340—**Slag** (a product of iron and steel blast of open hearth furnaces), C. L., from Milwaukee, Wis. (via car ferry), to Muskegon, Mich., 164c per net ton.

Item 345—**Slag,** cupola, C. L., from Muskegon, Mich., to Chicago, Ill., 300c per net ton.

51199. To cancel present commodity rate of 20c on **fluorspar or gravelspar,** C. L., min. wt. 40,000 lb., from Buffalo, N. Y., to Johnstown, Penn., classification basis to apply.

51206. To cancel Item 320 of B. & O. R. R. Tariff H-2610-I, publishing rates on **lime, phosphate of,** in barrels, C. L. min. wt. 30,000 lb., from Chicago, Ill., Gary and Miller, Ind., to Belle River, Hamilton, London, Toronto and Windsor, Ont., and similar rates in other individual lines' tariffs. Classification basis to apply.

51225. To establish on (a) **Sand,** naturally bonded molding, in all kinds of equipment, C. L.; sand (except ground or pulverized), in all kinds of equipment, C. L. (b) Sand, ground or pulverized, in all kinds of equipment, C. L. (c) Sand (except naturally bonded molding; ground or pulverized sand), in open-top equipment, C. L., (See Note 3), but orders will not be accepted for closed and open-top cars of less marked capacity than 60,000 and 80,000 lb., respectively, from Fernbank, Penn., to points in Connecticut, Illinois, Indiana, Iowa, Kentucky, Maine, Maryland, Massachusetts, Michigan, Missouri, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Vermont, West Virginia and Wisconsin, the same rates as now published from Carl, Penn., in N. Y. C. Tariff 1362 and N. Y. C. Tariff 140-A.

51226. To establish on **sand,** naturally bonded molding, in all kinds of equipment, C. L., from Elwood and Wilmington, Ill., to Indianapolis, 180c; Marion, 170c; Michigan City, 130c; South Bend, 150c and Terre Haute, Ind., 170c per net ton from Elwood and 180c per net ton from Wilmington, Ill.

51228. To establish on **sand** (other than ground or pulverized or naturally bonded molding), and **gravel,** in open top cars, without tarpaulin or other protective covering, C. L., from Parkersburg, W. Va., to the following points in Ohio: **B. & O. R. R.:** Belpre, Rockland, Porterfield, Little Hocking Torch Hill, Coolville, Frosts, 60c; Beebe, Stewart, Guysville, Canaanville, Atens, 70c; **C. & O. Ry.:** Nelsonville, 85c; McArthur 95c. **N. Y. C. Sys.:** Glouster, O., 90c per net ton.

51252. To establish on **limestone, agricultural,** unburnt, in bulk, in open-top cars, and **screenings, agricultural limestone,** C. L., from Spore, O., to Carrollton, O., 125c per net ton.

51257. To establish on **sand** (except industrial) and **gravel,** in straight or mixed carloads, (See Note 3), from Gowanda, N. Y., to Mt. Jewett, Penn., 90c per net ton.

51259. To amend (a) Item 8505 of C. F. A. L. Exceptions Tariff 130-Y, publishing Class 27.5 rating on **wool,** mineral (rock or slag), plain or saturated, in packages, provided for in Official Classification, C. L., min. wt. 24,000 lb., subject to Rule 34 of Official Classification, from points in C. F. A. territory to points in W. T. L. "Northwest" territory, by changing the commodity description to read as follows:

"Wool, mineral (rock or slag), plain or saturated, including plain batts and batts with paper backs, in packages provided for in Official Classification, C. L., min. wt. 24,000 lb., subject to Rule 34 of Official Classification."

(b) Item 3210 of Agent Kipp's Tariff 338-B, publishing 27½c rating on **wool,** mineral (rock or slag), plain or saturated, in packages provided for in Western Classification, C. L., min. wt. 24,000 lb., subject to Rule 34 of the Western Classification between points in C. F. A., T. L. A. and N. E. F. A. territories and points in W. T. L. territory, by changing the commodity description to read as follows:

"Wool, mineral (rock or slag), plain or saturated, including plain batts and batts with paper backs, in packages provided for in Western Classification, C. L., min. wt. 24,000 lb., subject to Rule 34 of the Western Classification."

51266. To cancel rates on **lime, acetate of,** C. L., min. wt. 40,000 lb. unless marked

*Note—The oil, tar and/or asphaltum not to exceed 10% by weight of the commodity shipped, the shipper to so specify on shipping orders and bills of lading.

Note 1—Minimum weight marked capacity of car.

Note 2—Minimum weight 90% of marked capacity of car.

Note 3—Minimum weight 90% of marked capacity of car, except that when car is loaded to visible capacity the actual weight will apply.

capacity of car is less, in which event the weight to be charged for shall be the actual weight when the car is loaded to its full visible capacity, i. e., completely filled (but not heavier than 10% above marked capacity), but in no case less than 36,000 lb., from Cherry Valley, Mich., to Albany, N. Y., Baltimore, Md., Boston, Mass., New York, N. Y., Newport News, Norfolk, Philadelphia, Penn., Rochester, N. Y., Rockland, Me., Syracuse and Utica, N. Y., published in Item 10480 of C. F. A. L. Tariff 218-J, classification basis to apply.

51282. To establish on **slag** (a product of iron and steel blast or open hearth furnaces) in open top cars, C. L., (See Note 3), from South Chicago, Ill., to Indianapolis, Ind., 135c per net ton.

51292. To cancel present rates on **stone** (crushed, ground or pulverized), **sand, slag** and/or **clay**, mixed with asphalt not exceeding 10%, C. L., (See Note 3), from Cincinnati, O., to various C. F. A. destinations, on traffic originating at points south of the south bank of the Ohio River and east of the Mississippi River, classification basis to apply.

51311. To establish on **slag**, commercial, crushed (a product of iron and steel blast or open hearth furnaces), C. L., (See Note 2), from Cleveland, O., to East Palestine, 100c, and Columbiana, O., 95c per net ton. Route—Via P. R. R. direct.

51316. To establish on **limestone**, ground or pulverized, unburnt, C. L., min. wt. 60,000 lb., from Gibsonburg, Maple Grove and Woodville, O., to Worthington, Penn., 195c per net ton. Route—Via P. R. R., New Castle, Penn., B. & O. R. R.

51317. To establish on **stone**, crushed; **slag and gravel**, coated with oil, tar or asphaltum* in open top cars, in straight or mixed C. L., (See Note 3), from New Castle, Penn., to points west of the Cumberland-Cresson line located on the B. & O., B. & L. E., Montour, P. R. R., P. & L. E., P. C. & Y. and P. & W. Va. Railroads, rates on basis of I. C. C. Docket 22598 (Shaw Junction) single or joint line scale, as follows, in cents per net ton:

	Sgl.	Jt.
20 miles and under	73	88
40 miles and over 20 miles	83	98
60 miles and over 40 miles	93	108
80 miles and over 60 miles	103	118
100 miles and over 80 miles	113	128
125 miles and over 100 miles	123	137
150 miles and over 125 miles	133	146

51343. To establish on **stone**, crushed, slag and gravel, coated with oil, tar or asphaltum* in open top cars, in straight or mixed C. L., (See Note 3), from Gray, Penn., to points in T. L. A. Trunk Line arbitrary and C. F. A. territories within a radius of 250 miles, rates to points on and west of the Cumberland-Cresson line on basis of I. C. C. Docket 22598 (Shaw Junction) single or joint line scale and to points east of the Cumberland-Cresson line on basis of I. C. C. Docket 25023 (Martinsburg) and P. S. C. Pa. Dockets 9114 and 9146 (Tyrone Forge) single or joint line scale.

Sup. 1 to W. D. A. 51153. Correction notice. White Docket Advice No. 51143, Docket Bulletin No. 2848, dated June 15, 1937, covering proposal to establish rates on **sand**, naturally bonded molding, in all kinds of equipment, C. L.; **sand** (except naturally bonded molding, ground or pulverized sand), in closed equipment, C. L.; **sand**, ground or pulverized in all kinds of equipment, C. L.; and **sand** (except naturally bonded molding, ground or pulverized sand), in open top equipment, C. L., from stations in the Muskegon, Mich., group to points in Illinois, Indiana, Iowa, Michigan, Missouri, New York, Ohio, Pennsylvania and West Virginia, should be corrected by changing the proposed column (b) rate to Andover, O., on page 1 of the exhibit to read 286c instead of 285c and the proposed column (b) rate to Leckrone, Penn., on page 2 of the exhibit, to read 352c instead of 332c.

51351. To establish on **crushed stone, crushed stone screenings** or **tailings**, C. L., from Greencastle, Ind., to Coalmont, Ind., 85c per net ton. Route—Via C. C. C. & St. L. Ry., Terre Haute, Ind., C. M. St. P. & P. R. R.

51352. To establish on **dolomite**, roasted (refractory dolomite, in granular form, treated or untreated, clinkered and burned to a dead state), C. L., (See Note 3), from Maple Grove and Narlo, O., to Henryetta, 540c; Sapulpa, Okla., 530c, and Shreveport, La., 540c per net ton.

51353. To establish on **stone**, crushed (in bulk), and **crushed stone screenings** (in bulk), in open top cars, C. L., from Spore, O., to Attica, O., 70c per net ton. Route—Via N. Y. C. R. R., Bucyrus, O., and P. R. R.

51354. To establish on **sand** (except industrial), and **gravel**, C. L., from Peru, Ind., to Mentone, Ind., 65c per net ton. Route—Via N. Y. C. & St. L. R. R. direct.

51355 To establish on **sand**, (except industrial), and **gravel**, in open top cars, C. L., from Elkhart, Ind., to Walkerton, Ind., 69c per net ton. Route—Via N. Y. C. R. R. direct.

51356. To establish on **crushed stone**, etc. (per Group D, Sup. 36, C. & E. I. Ry. Co. Freight Tariff 500-C), in open top cars, straight or mixed C. L., from Thornton, Ill., to Purcell, Volmer, Cantalope, Decker, Hazelton, Miller, Patoka and Princeton, Ind., 101c per net ton. Route—Via C. & E. I. Ry. direct.

51357. To establish on **stone, riprap, rubble and Quarry scrap**, in open top cars, C. L., from Annandale and Goff, Penn., to Apollo, Penn., 113c per net ton. Route — Via B. & L. E. R. R., Butler, Penn., and P. R. R.

51358. To establish on **sand** (other than industrial), and **gravel**, in open top equipment, C. L., from Beach City, O., to Orrville, O., 60c per net ton. Routes—Via B. & O. R. R., Massillon, O., W. & L. E. Ry.; via P. R. R.

51425. (a) To Amend Item 7540A of Sup. 11 to C. F. A. L. Tariff 130-Y (exceptions to Official Classification), naming scale of rates of 38% of 6th class on **stone**, crushed, slag or gravel, coated with oil, tar or asphaltum, in open top equipment, C. L., applying from various points in the state of Ohio to destinations in the state of Ohio, applicable on intrastate shipments only, by providing for the addition of "Ironton, Ohio", as a point of origin therein.

(b) To establish on **stone**, crushed; **slag or gravel**, coated with oil, tar or asphaltum*, in open top equipment, C. L., (See Note 3), from Chillicothe and Ironton, Ohio, to points in West Virginia, Kentucky and Virginia on the N. & W. and C. & O. Rys., the Buckland scale plus 10c per ton, except to points on the C. & O. Lexington division, the proposed rates are on basis of mileage scale applicable within C. F. A. territory.

51492. To establish on (a) **Lime**, common, hydrated, quick or slaked; also agricultural lime, straight or mixed, C. L., min. wt. 30,000 lb. (See Note).

(b) **Lime**, common, hydrated, quick or slaked; also agricultural and fluxing lime, straight or mixed C. L., min. wt. 50,000 lb., (See Note).

Note—When the carload charge based on the higher rate at actual weight (but not less than the minimum weight specified for the higher rate) exceeds the charge on the lower rate at actual weight (but not less than the minimum specified for the lower rate), the latter charge will apply from Milltown, Ind., to Black Fork, Ohio, rate of (a) 16½c; (b) 13c. Route—Via Southern Ry., New Albany, Ind., B. & O. R. R.

51513. To establish on **limestone**, agricultural, unburned, in bulk, loaded in open top cars only, C. L., (See Note 3), from Carey, Ohio, to Hudson, Ohio, rate of 90c per net ton. Route: Northern Ohio Ry.-Copley Jct., Ohio-A. C. & Y. Ry.-Akron, Ohio-Penn. R. R.

51515. To establish on **limestone**, agricultural, unburned, in bulk, loaded in open top cars only, C. L., (See Note 3), from Carey, Ohio, to Carrollton, Ohio, rate of 120c per net ton. Route: Northern Ohio Ry.-Copley Jct., Ohio, A. C. & Y. Ry.-Mogadore, Ohio-W. & L. E. Ry.

51524. To establish on **sand** (other than ground or pulverized or naturally bonded molding), and **gravel**, (See Note 3), provided that orders will not be accepted for cars of less marked capacity than 2000 lb., and provided further that when a shipper orders a car of such marked capacity or greater, and the carrier is unable to furnish car ordered and furnishes a car of greater capacity than ordered, the minimum weight for the car furnished shall be that which would have obtained had the car ordered been furnished and used, from Parkersburg, W. Va., to Belpre, Rockland, Porterfield, Little Hocking, Torch Hill, Coolville, Frosts, 60c per net ton; Beebe, Stewart, Guysville, Canaanville, Athens, 79c per net ton; Nelsonville, 85c; McArthur, 95c, and Gloucester, Ohio, 90c per net ton.

51537. To cancel commodity rate of $3.15 per net ton, min. wt., 40,000 lb., on **phosphate rock**, ground, in bulk, from Detroit, Mich., to Chicago, Danville and Joliet, Ill. Classification basis to apply.

51545. To establish on **limestone, agricultural, unburnt** in bulk, in open-top cars and screening, agricultural limestone, (See Note 3), from Spore, Ohio, to East Canton and Robertsville, Ohio, 115c per ton.

51557. To cancel commodity rate of 214c per ton of 2240 lb., min. wt. 36,000 lb. on **limestone**, crushed (applies only on traffic moving in open-top equipment), as, published in Item 11450 of C. F. A. L. Tariff 218-J, from Erie R. R. stations to Bradford, Penn. Classification basis to apply.

Southern

14905. **Crushed stone**, C. L. Establish 60c net ton. Dolcito, Ala., to Cullman, Ala. (intra-state). Truck competitive. Expires Dec. 31, 1937.

14930. **Lime**, C. L. Establish rates from Kingsport, Tenn., to various destinations in Ohio, Ky., Va. and W. Va., on basis of scale prescribed in I. C. C. Docket 26829, as amended.

14945. Provide a uniform C. L. min. wt. in connection with rates on **acetate of lime** from Lyle, Tenn., to Boston, Mass., Edgewater, N. J., Parlin, N. J., Philadelphia, Penn., New Orleans, La., Brunswick, Ga., Charleston, S. C., Jacksonville, Fla., Savannah, Ga., Panama City, Fla., Mobile, Ala. and Pensacola, Fla., of 50,000 lb., except where for carriers' convenience a car of 36½ ft. or less in length is furnished, min. wt. will be 45,000 lb.

15014. **Crushed stone**, C. L. Establish 90c net ton from Yellow Rock, Ky., to Whitesburg, Ky. (intrastate). Truck competitive. Expires 60 days from date effective.

15029. **Crushed stone**, C. L. Establish 271c net ton from Lithonia and Stone Mountain, Ga., to St. Louis, Mo., and E. St. Louis, Ill., when for points in W. T. L. territory.

15035. **Limestone or marble**, C. L., min. 88,000 lb. Establish rates from Gantt's Quarry, Ala., to E. St. Louis, Ill., and St. Louis, Mo., made with relation to rates in effect from Tate, Whitestone and Cartersville, Ga., and Dolcito, Ala.

15047. **Sand, gravel, stone, slag and chert**, C. L. Establish rates from Conifer, Ala., to stations on the A. & W. P. and W. Ry. of Ala., on basis of the single line mileage scale.

15049. **Mica**, crude, scrap or waste, suitable for grinding purposes only, C. L., min. 60,000 lb. Establish 190c per net ton from Murphy, N. C., to Biltmore, N. C.

15063. **Plaster**, in mixed C. L. with blocks and tile, building. Cancel Item 158, page 11, Note A of Exceptions 16 to Southern Classification, permitting mixed C. L. rule in S. F. T. B. Tariff 257-B to apply.

Western

E-43-44. **Stone, rip rap**, C. L., (See Note 3), but not less than 40,000 lb., from Louisville, Neb., to Dakota City, Neb., and Sioux City, Iowa. Rates: Present—Dakota City, 92c per net ton of 2000 lb.; Sioux City, 92c per ton of 2000 lb. Proposed—80c per ton of 2000 lb.

D-25-52. **Plaster** and related articles, C. L. From Fort Dodge, Ia., to points in Wyoming. Rates to representative points.

To	40,000	Present 60,000	80,000
Corlett, Wyo.	38½	27½	25½
Laramie, Wyo.	44½	27½	25½
Cooper Lake, Wyo.	50½	37½	
		Proposed	
	(2)40,000	60,000	80,000
Corlett, Wyo.	28	C	C
Laramie, Wyo.	28½	C	(1)25½
Cooper Lake, Wyo...	28½	C	

C.—Cancel. (1)—Rate to be transferred to Item 550 of W. T. L. Tariff 352A and continued as a plant to plant rate. Route via C. G. W., Council Bluffs, Ia., or Ill. Cent., Council Bluffs, Ia., or Ft. D. D. M. & S., Huxley, Ia., C. M. St. P. & P., Council Bluffs, Ia., or Ft. D. D. M. & S., Boone, Ia., C. & N. W., Council Bluffs, Ia., thence Un. Pac. (2) Publish in Section 2 of W. T. L. Tariff 352A.

E-41-222. **Sand, gravel and *stone,** crushed, C. L., (See Note 3), but not less than 40,000 lb.

*Rates will apply only from Louisville, Neb., from Platte River Zone Pits, viz.: Ashland, Fremont, Louisville, Oreapolis, South Bend and Valley, Neb., to Council Bluffs, Ia.

Present, 55c per ton of 2000 lb. No switching charges will be absorbed at point of origin. Proposed, 50c per ton of 2000 lb. No switching charges will be absorbed at point of origin. Rate will expire with December 31, 1937, unless sooner canceled, changed or extended.

Sup. 1 to E-41-216. **Sand, silica,** C. L., (See Note 3), the actual weight will be the min. wt. In no case shall the min. wt. be less than 40,000 lb., from Klondike, Mo., to Redfield, Ill. Rates, present combination. Proposed, $2.20 per net ton.

Sup. 3 to E-41-217. **Limestone,** crushed or ground, C. L. Usual min. wt. to govern, from Louisville, Weeping Water, Neb., Krause and Stolle, Ill., and Hannibal, Mo., to stations in Minnesota, North Dakota and South Dakota. Rates as shown in App. No. E-41-217, Application Bulletin No. 4547, dated May 25, 1937.

E-151-12. **Feldspar,** crude, C. L., from Eastbank Mississippi River crossings (to apply as a proportional rate). Rates (in cents per 100 lb.):

To	Pres.	Prop.
Rochester, N. Y.	*28	26
Trenton, N. J.	*34	32

*Class 21.

New England

42007. (a) **Mortar,** dry; (b) **plaster,** stucco, min. wt. 50,000 lb. to Corona, N. Y., from Canaan and E. Canaan, Conn.: (a) $2.10 net ton, (b) $2.20 net ton; Lee and West Stockbridge, Mass., (a) $2.20 net ton, (b) $2.60 net ton. Present—Sixth class. Reason—To provide same rates on mortar as now in effect on lime and to provide same basis on stucco plaster as in effect from Oakfield, N. Y.

42075. **Limestone, agricultural, ground,** min. wt. 60,000 lb., Dudswell or Marbleton, Que., to Enosburg Falls, Vt. Present—20; proposed—14. Reason: To place Enosburg Falls, Vt., on a parity with other northern N. E. consuming points where specific rates are in effect.

42121. To cancel commodity rates on **lime, lime ashes, limestone** and **dry mortar** from Springfield, Vt., to destinations on the B. & M. R. R., S. V. R. R., B. & A. R. R. and N. Y. N. H. & H. R. R. and lateral lines; also to New York City and Brooklyn, N. Y., deliveries of the N. Y. C. R. R., published in Springfield Terminal Ry. I. C. C. 23 and 26 (Item 10A) and establish in lieu thereof commodity rates on **ground or pulverized limestone (not whiting),** from Springfield, Vt., to destinations on the B. & M. R. R., and on **common, hydrated quick or slaked lime** from Springfield, Vt., to destinations named in S. T. Ry. I. C. C. 23 and 26 (Item 10).

Southwestern

11571. **Plaster** in mixed carloads with **gypsum blocks** and/or **gypsum hollow building tile.** To establish exception to Rule 10 of Western Classification, permitting at their respective rating, from, to and between points in Southwestern territory.

11638. To establish rate of 24½c per net ton on **silica sand,** C. L., (See Note 2), from M. & A. stations Neosho, Mo. to Everton, Ark., incl., and K. C. S. stations Neosho, Mo., to Sulphur Springs, Ark., incl., to K. C. S. stations Hatton, Ark., to Shreveport, La., incl.

11639. To adjust the rates in S. W. L. Tariff 31-K, I. C. C. 2820, on **plaster** and related articles to Texas and Oklahoma differential territory using differentials prescribed by the Texas Commission in lieu of the present differentials.

11663. To establish 80% of distance scale rates published in Item 800, S. W. L. Tariff 162-L, on **crushed stone** from Moline, Kan., on **sand** and **gravel** from Arkansas City, Kan., and on sand, gravel and crushed stone from Oklahoma producing points to Waynoka, Okla.

11700. **Lime.** To establish rates on Lime, C. L., from points of origin named in S. W. L. Tariff 227-A to all unnamed open stations in the territory covered by S. W. L. Tariff 227-A, on the I. & S. 3742 scale.

11702. **Lime.** To establish rates on lime, C. L., from Memphis, Tenn., to points in the Southwest named in S. W. L. Tariff 227-A, based on the I. & S. 3742 scale.

11720. **Talc, talc tailings, soapstone, etc.** To establish the following rates, applied to the first class rates which became effective April 9, 1937, to, from and between points in Southwestern and Kansas-Missouri Territories:

(A) Talc, testing not less than 99% through 200 mesh screen, C. L., min. wt. 60,000 lb.—Class 16.

(B) Talc, ground or pulverized, other than described in (A) C. L., min. wt. 60,000 lb.—Class 16.

(C) Talc tailings, C. L., min. wt. 70,000 lb.—Class 13.

(D) Soapstone, testing not less than 99% through 200 mesh screen, C. L., min. wt. 60,000 lb.—Class 16.

(E) Soapstone, ground or pulverized, other than described in (D), C. L., min. wt. 70,000 lb.—Class 13.

(F) Soapstone, crude, not ground or pulverized (not blocks or slabs), C. L., min. wt. 70,000 lb.—Class 13.

11731. To cancel obsolete or unused rates on **Gypsum rock,** C. L., published in A. T. & S. F. Tariff 6681-F, I. C. C. 12691, applying from Medicine Lodge, Kan., to points in Colorado, Illinois, Iowa, Kansas, Nebraska, Missouri and Oklahoma, as follows:

Page 4, Cancel all rates to Colorado.

Page 5, Cancel all rates to Illinois, except continue rates 14½c and 15½c per 100 lb., min. 60,000 lb., and 20½c per 100 lb., min. 30,000 lb., applying to East Ft. Madison (proportional destined to points in Canada).

Pages 6, 7 and 8, Cancel rates to Iowa, Kansas, Missouri and Superior, Neb.

Pages 10 and 11, Cancel rates to Oklahoma.

11733 (Cancels 11702). To establish rates on **lime,** C. L., from Memphis, Tenn., to points in the Southwest named in S. W. L. Tariff 227-A, based on the I. & S. 3712 scale; proposed rates not to be subject to Rule 10 of the Consolidated Classification.

11738. To amend S. W. L. Tariff 162-L, Agent Peel's I. C. C. 2908, by establishing from Stringtown, Okla., to Beaumont, Tex., a rate of $1.80 per ton of 2000 lb. on **crushed stone,** natural, and **crushed stone, asphalt coated,** straight C. L., and a rate of $2.00 per ton on the same commodities from Stringtown, Okla., to Dowling, Griffing, Chaison, Higgins, Nederland, Rice Farm, Sun, Atreco, Magpetco, Port Neches, Port Arthur, West Port Arthur and Smith's Bluff, Tex.

Illinois

8427-2. **Moulding sand,** C. L., from Gladstone, Ill., to Wisconsin points:

To (representative)	Pres.	Prop.
Beloit, Wis.	225	180
Ft. Atkinson, Wis.	225	190
Janesville, Wis.	225	180
Kenosha, Wis.	225	200
Milwaukee, Wis.	225	210
Racine, Wis.	216	200

8433. **Sand and gravel,** C. L., usual min. wt., from Pekin, Pit No. 5 (Crescent), Ill., to Boody, Ill. Present, no rates. Proposed, 88c net ton.

8435. To cancel rate of 17c per 100 lb. on **lime** in straight C. L. or in mixed C. L. with **plaster, stucco** or **roofing pitch,** min. wt. 30,000 lb., from E. St. Louis, Mo., to Milwaukee, Wis.

Sand-Lime Brick Production and Shipments

THE FOLLOWING DATA are compiled from reports received direct from producers of sand-lime brick located in various parts of the United States. They may be considered representative of the industry.

Eleven active sand-lime brick plants reported for the month of June, and ten active plants reporting for the month of May, statistics for which were published in July.

Average Prices for May

Shipping Point	Plant Price	Delivered Price
Milwaukee, Wis.	$10.00	$12.50
Pontiac, Mich.	13.50	14.50
Detroit, Mich.	—	16.00
Mishawaka, Ind.	9.35	—
Syracuse, N. Y.	14.00	16.00 -20.00
Saginaw, Mich.	11.00	—
Madison, Wis.	11.50	13.00
Watertown, Mass.	—	13.50
Grand Rapids, Mich.	11.00	—

Statistics for May and June

	May†	June*
Production	3,752,515	4,170,865
Shipments (rail)	347,000	659,262
Shipments (truck)	3,193,220	3,663,777
Stock on hand	4,290,300	4,136,385
Unfilled orders	2,680,000	3,070,000

† Ten plants reporting; incomplete, three not reporting unfilled orders.

* Eleven plants reporting; incomplete, five not reporting unfilled orders.

Sand-Lime Standards

SIMPLIFIED PRACTICE RECOMMENDATION R38-37, SAND-LIME BRICK is now available in printed form, by writing the Government Printing Office, Washington, D.C.

The recommendation, which was originally effective July 1, 1925, provides for one standard size of sand-lime brick having a length of 8-in., width of 3¾ in., and thickness of 2¼ in.

The revision retains the original dimensions of the standard size brick and adds a tolerance of ¼ in. on length and ⅛ in. on thickness and width. Recommendation is effective from June 15, 1937, and is subject to regular review by a standing committee of the industry.

THE INDUSTRY

New Incorporations

Dolomite Products, Inc., Ocala, Fla.; M. E. Owens and H. L. Gregory, incorporators. For the purpose of mining.

The Grand River Limestone Products Co., Miami, Okla.; capital stock $5000. Incorporators are Elmer Hupperfelt, John Hupperfelt and T. H. Miller, all of Miami, Okla.

River Bend Sand & Gravel Co., Salem, Ore.; has increased its capital stock from $25,000 to $50,000. Incorporators are Carl R. Staats, N. H. Looney, Jack Taggaret and A. C. Suhre.

Agricultural Lime Co., Jackson, Mich., to produce agricultural lime and crushed rock. Partnership formed by Zora Gould, P. M. Gould, John Cox of Detroit, Mich., and E. M. Fitzsimmons.

Atlanta Lime Corp., Wilmington, Del.; to deal in chemical, building and agricultural lime, mortars and other minerals. Capital $510,000. Incorporators are Walter Lenz, B. R. Jones and J. P. Murray.

Rock Wool Corp. of America, 30 W. Washington St.; 1000 shares no par value common stock. Incorporators are E. H. Lewis, A. Reinsberg, and A. A. Lewis. Correspondent, Edward I. Elman, 77 West Washington St.

Tri-State Development Co., Estatoe, N. C.; capital stock of $100,000; to mine, prospect and extract minerals. Incorporators are Charles S. Noble and Clarence Falk of Washington, D. C. and Dover Founts of Burnsville, N. C.

Architectural Terrazzo, Inc., 1131 Western St., South Bend, Ind.; resident agent, Theodore A. Kiosinski; capital stock 500 shares, $2 par value, to manufacture cement, tile, mosaic, etc. Incorporators are William T. Cetrri, Sam Vanier and Frederick Cecchi.

Obituaries

Harry A. Ambler, 42, superintendent of the Superior Portland Cement Co., at Concrete, Wash., died July 8.

Mr. Amber attended public school in St. Louis, Mo., and graduated from the Missouri School of Mines and is a member of Sigma Nu fraternity. He served as a captain in the army during the World War. He was wounded in battle. He received a citation from General Pershing and the Croix de Guerre.

In 1922 he started as assistant chemist for the Superior Portland Cement Co., he was promoted to chemist and finally to superintendent. He developed the company's Hyuriy quick-strength cement.

John M. Buchheit, 65, who for the past 51 years has been employed at the Brixment plant and quarries of the Louisville Cement Co., Speed, Ind., and who was plant superintendent for twenty years of that time, was fatally injured in an automobile accident on June 23.

Elmer Wesley Cummings, 47, foreman of the Phenix Marble plant of the Independent Gravel Co., Joplin, Mo., was killed on June 28 when he fell under a 60-ton railroad car of crushed stone while at work.

William B. Lalor, assistant general sales manager of the Coplay Cement Manufacturing Co., Philadelphia, Penn., died in the Germantown Hospital June 16.

Fred Charlton Mason, 54, vice-president of the Memorial Stone Co., and formerly president of the Arabia Granite Co., died of a heart affliction on July 8, in Atlanta, Ga. He was a member of the North Avenue Presbyterian Church, the Masonic lodge, Knights Templar, Scottish Rite, Shrine and the Gamma Delta Psi fraternity, and the Atlanta Kiwanis Club.

Donald McAdie, secretary, for about 30 years, of the British Columbia Cement Co., Ltd., Victoria, British Columbia, died July 9. At the time of his death he was a member of the board of management of the First United Church, a charter member of the local Kiwanis Club in which he was very active. He was also an active member of the Victoria Burns Club, Uplands Golf Club and the Y. M. C. A.

John C. L. Ritter, St., 54, 1511 G St., S.E., Washington, D. C., who was general manager of the Prince Georges Sand & Gravel Co., Inc., at Silver Hill, Md., had been a prominent member of the Southeast Citizens Association, died June 17 after an illness of three weeks. He was very active in the association being chairman of the Sanitary Matters Committee and its Rivers and Harbors Committee and formerly chairman of its Public Utilities Committee and a delegate to the Federation of Citizens' Associations.

Charles L. Schlater, 78, well-known hardware salesman for the Woven Wire Fabrics Division of John A. Roebling's Sons Co., died June 29 at his home in Philadelphia, Penn., of a heart ailment.

Jacob Henry Schluchter, 78, retired president of the Rochester Sand and Brick Co. and widely known in the building trade in Detroit, died July 14 at his daughter's home, 18484 Scarsdale Ave., Detroit, Mich.

Arthur G. Tews, 33, sales manager of the Tews Lime and Cement Co., died in his home, 2802 N. Forty-fifth St., Milwaukee, Wis., on July 5.

Personal

H. B. Allen, for fourteen years New York district sales manager of The Babcock & Wilcox Tube Co., has resigned to become vice-president of John B. Astell & Co., Inc., 90 West Broadway, New York.

H. A. Barber was recently made a vice-president of the Barber-Greene Co., Aurora, Ill. In his new position he will continue to assist his father, H. H. Barber, president and engineering genius of the company, in the supervision of engineering and manufacturing. The other officers are W. B. Greene, vice-president and treasurer, and D. G. McIllwraith, secretary.

Harlowe Hardinge, vice-president and general manager, Hardinge Co., Inc., has returned from a visit to the West Coast to his office in York, Penn.

Everett D. Graff, formerly first vice-president was elected president at a meeting of the board of directors of Joseph T. Ryerson & Son, Inc., in June. Mr. Graff has been with the company for 31 years. The other officers and their respective positions are: Edward L. Ryerson, Jr., chairman of the board of the Ryerson Co. and vice-chairman of the Inland Steel Co.; W. F. Kurfess, vice-president; V. H. Dieterich, vice-president; Ainslie Y. Sawyer, assistant to the president.

Everett D. Graff

Simeon Jester, Jr., formerly with the sales department of the Philadelphia, Penn., office of American Engineering Co., has been transferred to its Chicago, Ill., office.

Walter L. Penick, formerly western manager for the Hardinge Co., York, Penn., has joined the organization of the Western Precipitation Corp., Los Angeles, Calif. In his new work he will be field consultant on dust and fume control problems.

George S. Whyte, formerly president of the MacWhite Co., Kenosha, Wis., has been

Made of Acid Open Hearth Steel Wire

Round Strand
Flattened Strand
Preformed
Steel Clad
Non-Rotating

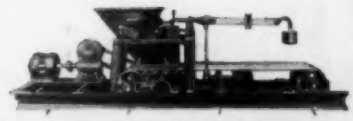
The Service Record of this wire rope continues to make and hold friends.

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.
Established 1857

5909 Kennerly Avenue St. Louis, Mo.
New York — Chicago — Denver
San Francisco — Portland — Seattle

SCHAEFFER
POIDOMETERS



GUARD PROFITS

These efficient, accurate, economical weighing and feeding machines have proven their value to operators of cement mills, for accurately proportioning stone and clay—also clinker and gypsum by weight and not by volume.

The Poidometer is self-contained. The scale beam is graduated in pounds or kilos, and can be set at whatever amount of material may be required per foot of belt travel; the gate is then adjusted to suit this weight, and the machine will deliver the pre-determined amount of material with an accuracy of ninety-nine per cent.

Write for Catalog No. 2 and get complete profit-producing facts!

Schaeffer Poidometer Co.
2828 Smallman St.
PITTSBURGH, PA.

elected chairman of the board of directors. He was succeeded as president by his son, Jessel S. Whyte, who is also general manager. Other members of the board are H. E. Sawyer, re-elected as vice-president, treasurer and director; Robert B. Whyte, newly elected, and W. Robert Johnston.

Sand and Gravel

Marshalltown, Iowa: The county has opened a gravel pit south of State Center for use in graveling roads in the township.

Crushed Stone

Caney, Kan., has purchased a new Rogers portable rock crusher.

Marysville, Kan.: Quarrying has begun on Nick Koppes farm for rock for construction.

Exira, Iowa: Fourteen cars of limestone have been ordered for farmers in Audubon county.

Brookfield, Mo.: The Farm Bureau office announces that the lime stone pulverizer will begin starting operations again.

Fort Madison, Iowa: Lee county WPA is awaiting the approval of Washington to extend operations in the stone quarries.

Independence, Kan.: The county commissioner announced that a WPA rock quarry project is being moved to the Patte quarry.

Kirksville, Mo.: The Adair County Soil Conservation Assoc. has been crushing large amounts of rock for agricultural lime purposes.

St. Louis, Mo.: St. Clair County's second rock quarry has been placed in full operation and is now producing 50 tons of stone per hour.

Ft. Madison, Iowa: Approximately 3500 yards of rock has been quarried and is awaiting transportation to the water front here for seawall use.

Wyanet, Ill.: The village board is faced with the problem of securing a stone crusher; the new project, it is estimated, will require 7500 yards of gravel.

Hamilton, Mo.: An explosion of dynamite at the Sheridan township rock crusher did some damage to crushed rock bin, the elevator and other wooden structures.

Ft. Madison, Iowa: The Lee county board has been trying to purchase two stone crushers, that are now in use in county quarries at Sandusky and Franklin townships.

Boonville, Mo.: The WPA project to build the Franklin Special Road District awaits final approval from Washington. The new quarry from which the rock will be taken for the project is located on the Claud White farm.

Manufacturers

New York Belting and Packing Co., Passaic, N. J., announces the appointment of the Whittle Hose & Rubber Co., 549 W. Randolph St., Chicago, Ill., as distributors.

The Lincoln Electric Co., Cleveland, Ohio, announces the addition of William F. Fischer's services for arc-welding users in Sacramento, Calif., his address is 1241—32nd Street.

The Buffalo Scale Co., Buffalo, N. Y., announces the appointment of E. J. Kelly, 2010 Locust St., St. Louis, Mo., as distributor. His territory includes Missouri and Southern Illinois.

Thermoid Co., Trenton, N. J., announces the addition to its engineering staff of George J. Wyrough, who will be assigned to production and product development work on industrial rubber products.

Pettibone Mulliken Co., 4710 W. Division St., Chicago, Ill., was reorganized on July 1, operations and personnel will be continued under the new firm name **Pettibone Mulliken Corp.** at the same address.

The Bucyrus-Erie Co., South Milwaukee, Wis., has re-appointed the Connelly Ma-

PYRASTEEL

FOR HIGH TEMPERATURES

PYRASTEEL kilns represent 25 years' experience in the manufacture of ALLOY STEEL. Just one reason why the kiln illustrated above gave six years' continuous service at 1950° F. And why the PYRASTEEL kiln ends are preferred from Coast to Coast as well as in foreign countries—why they make tight sealing practicable and represent the most direct method of fuel economy.

PYRASTEEL kiln ends are furnished completely finished and are easy to attach.

CHICAGO STEEL FOUNDRY CO.
37th Street & Kedzie Ave.
CHICAGO, ILL.
Makers of Alloy Steel for over 25 years

BACON
FARREL
CRUSHERS

Complete Plants Designed and Equipped. Screens, Elevators, Conveyors, Quarry, Sand and Gravel Plant Equipment. Engineering Service.

EARLE C. BACON, Inc.
17 John Street New York, N. Y.

UNIVERSAL SCREENS

HAVE WHAT IT TAKES

To handle damp, sticky materials.

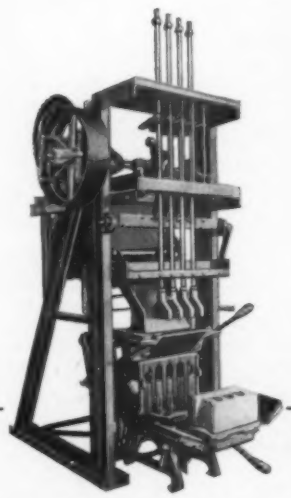
A Pennsylvania producer writes us: "Our material is very damp, but your Screens are giving us very good results."

Remember—in the UNIVERSAL you are offered a tried, proven and guaranteed product, the result of constant improvement and refinement since 1919. The performance of the late model UNIVERSALS will surprise and please you.

The best in Vibrating Screens—yet priced surprisingly low—$296 and up.

Write today for complete catalog

UNIVERSAL VIBRATING SCREEN CO.
RACINE — WISCONSIN



"ANCHOR"

Complete equipment for making concrete, cinder and other light weight aggregate units, including engineering service for plants and revamping of old ones for more economical service.

Hobbs block machines, Anchor tampers, Anchor Jr. strippers, Stearns power strippers, Stearns mixers, pallets, Straublox Oscillating attachments, etc.

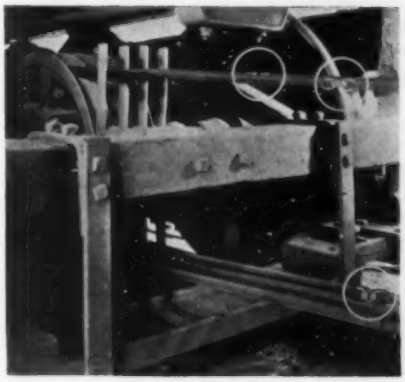
Repair parts for Anchor, Ideal, Universal, Stearns, Blystone mixers and others.

Anchor Concrete Mchy. Co.
G. M. Friel, Mgr. Columbus, O.

New MACHINERY & EQUIPMENT

V-Belt Fastener

FLEXIBLE STEEL LACING CO., Chicago, Ill., announces new fastener for joining C-section V-belts of fabric core, cross weave construction. The fastener makes possible the installation, shortening or replacement of V-belts on the job.



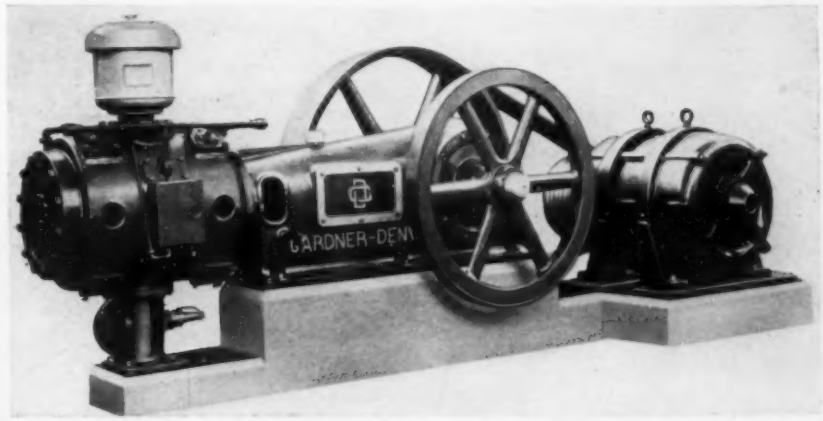
Belt fastener

Unique features claimed are the double rocker pin supported in bronze bushings and the method of holding the end plate to the belt end without materially weakening the belt or bulging its sides. The rocker pin is made of special alloy steel hardened to give long lasting service. No metal touches the pulleys.

The "Alligator" V-belt fastener was developed in coöperation with several railroads in the heavy duty services of axle lighting and air conditioning of passenger cars where it made an excellent service record. It has been tested and improved for several years, it is said, and is now being supplied for general distribution.

Air Compressor

GARDNER-DENVER CO., Quincy, Ill., announces an improved single-stage, horizontal air compressor for heavy-duty, full-load service and continuous operation at low power costs. Known as the "RX" compressor, it has totally enclosed dustproof construction without sacrifice, it is said, of accessibility, as well as accurate balance and freedom from vibration.



Improved single-stage, horizontal air compressor with automatic adjustment for air requirements

Another important feature of the "RX" compressors is the Electro-Pneumatic control. With this control the compressor always starts unloaded, and the air supply is automatically adjusted to fit the air requirements, resulting in exceptional part-load economy. The compressors are equipped with Timken tapered adjustable roller main bearings.

Percussion Drill

SULLIVAN MACHINERY CO., Claremont, N. H., announces the L-12, a 64-lb. rock drill, developed, it is said, to give the operator an easy handling medium weight machine with extra drilling power and rotational strength for deep hole work in hard rock. This drill, it is claimed, can handle heavy deep hole drilling with the same speed of a heavy weight sinker and yet not fatigue the drill runner.

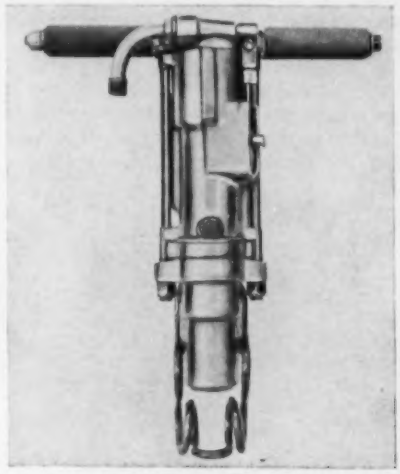
The drill gets its power from a positive compression thrown axial type valve coupled with a 2⅞-in. bore and long stroke piston. Besides handling standard sizes of collared steel, this machine has special constructions which can be provided to handle round lugged steel or shankless steels of striking block construction. Also a vented front end construction can be provided to qualify with all laws on dust control.

Feeder Crusher Unit

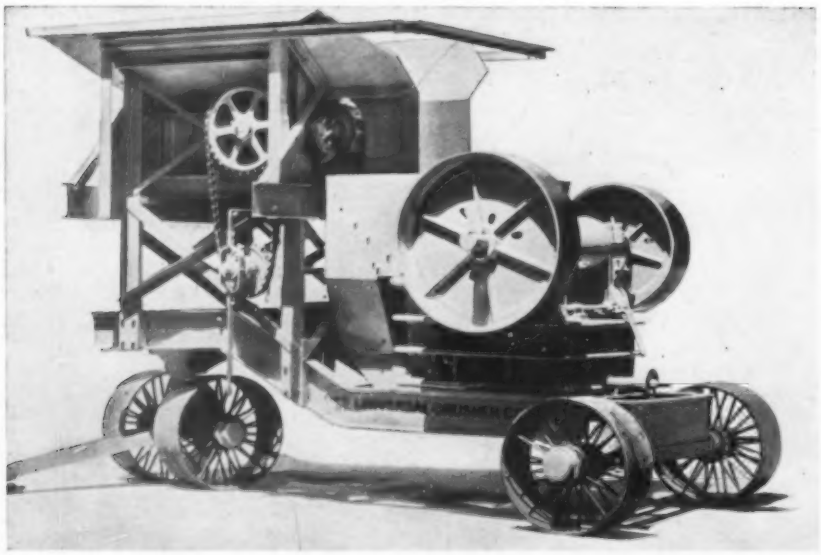
UNIVERSAL CRUSHER CO., Cedar Rapids, Ia., has recently developed a portable, apron-feeder, crusher unit, which includes a Universal primary jaw crusher, mounted on a portable rig together with an apron feeder super-imposed above it, permitting of a steady feed of rock into the crusher.

The maker states, "This apron feeder not only speeds up output by maintaining a steady flow of rock to the crusher, but saves much time formerly required in setting up and dismantling stationary feeders which are usually bulky units."

This combination of crusher and feeder is made to operate in conjunction with a similar crushing equipment on which is mounted a roll crusher for secondary crushing. A belt conveyor carries the primary crushed rock from one crusher to the other; a sec-



Medium weight drill for use in hard rock



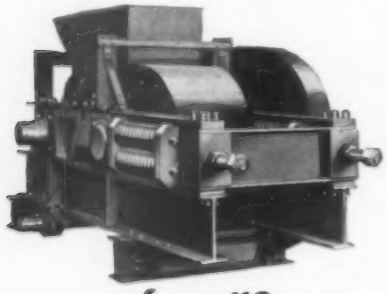
Portable crusher unit includes primary jaw crusher and feeder

ond conveyor unit handling the final product to temporary storage bins.

Roll Reduction Crusher

PIONEER GRAVEL EQUIPMENT MANUFACTURING CO., Minneapolis, Minn., is announcing its new "Super 40" roll reduction crusher designed to meet the extensive demand for crushed gravel and the smaller sizes of crushed stone. Features are (1) power application to a pulley on the counter shaft, then through a pinion to drive a gear on the stationary roll, which permits a 6½ to 1 reduction; (2) star gears on the opposite end of the stationary roll and on the floating roll which permit of adjustment and free action of the floating roll against the safety springs; (3) adjustment of width of opening between the rolls by moving the floating roll and the use of a backstop wedge which holds the rolls the correct distance apart; (4) floating roll springs, four on each side, which have 3 in. of give, or of safety, to prevent tramp iron or other foreign matter from choking or breaking the crusher; in addition the bolts holding the tension springs are designed to shear off before the crusher can be damaged.

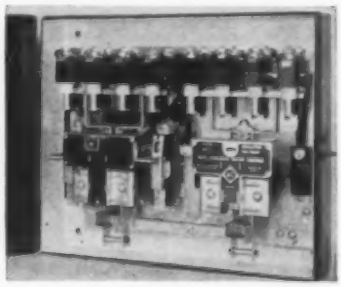
The size is 40x22 in.; the weight 9 tons, the electric horsepower required 75 to 90; the capacity 12 to 180 cu. yd. per hr., depending on the amount of reduction or the size of the product.



THE NEW PIONEER *Super 40* ROLL CRUSHER

Reversing Motor Starter

ALLIS-CHALMERS MANUFACTURING CO., Condit Works, Boston, Mass., has placed on the market a new reversing motor starter, designated type AP-7-R, furnished for 7½ hp., 550 volts, or less. The starter consists of two type AP-7 motor starter units, mechanically interlocked so that either unit cannot be closed if the other is closed. The starter units are equipped with Ruptors. The Ruptors consist of enclosing chambers which confine and depotentiate the arc formed by circuit interruption. They greatly increase the interrupting ability of the contacts and form individual isolating barriers between contacts of opposite polarity.



Reversing starter for small motors

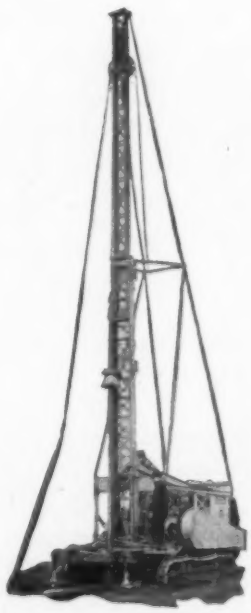
Other features claimed are as follows: Large silver double break contacts—long life—no contact dressing needed; solenoid operated, vertical make and break—silent operation; unit construction—pole units consisting of individual molded bases mounted on a steel chassis—true contact alignment; enclosed temperature overload relays affording positive motor protection; under-voltage protection inherently provided.

Blast-Hole Drill

BUCYRUS-ERIE CO., South Milwaukee, Wis., announces the newest in the Bucyrus - Armstrong line of blast-hole drills, known as 27-T, which weighs 18,400 lb. and has a tool capacity of 2000 lb.

The performance of the first of these machines in service in the first month on the job shows, it is claimed, that it drilled 4544 ft. of 6-in. hole through iron ore and Taconite at 11c per ft., including power, labor, and supply costs. Daily production was more than 200 ft., with holes averaging about 22 ft. in depth.

Exclusive features claimed include, as regular or optional equipment, a new built-in tool wrench, special bumper reel, large operator platform and other operator conveniences, rubber-insulated tool guide and sheaves, rubber shock-absorber under the crown sheave, and a fast, snappy, highly penetrating drilling action. The 27-T is furnished with 33- or 40-ft. derrick, caterpillar-type mounting, and a choice of gasoline, Diesel, or electric power.



Blast-hole drill

chinery Co., 509 North 27th St., Billings, Mont., as its distributors, in practically all of Montana and a portion of Wyoming.

The Ironton Fire Brick Co., Ironton, Ohio, announces through its vice-president, that Warren C. Drake, 21 West St., New York, N. Y., has been appointed its New York representative. He will handle clay fire brick as well as refractory cements, plastic refractories, and castables.

Iron & Steel Products, Inc., is moving to its recently acquired 27 acre plant site at East 135th Street and C. S. S. & S. B. R. R., Chicago (Hegewisch Sta.), Ill., also it has opened a Pittsburgh, Penn., office under the supervision of C. W. McKirdy, which is located in the Investment Building of that city.

Caterpillar Tractor Co., Peoria, Ill., announced: Paul Weeks, who was manager of its Washington, D. C., office until his transfer to Peoria about two years ago, returns to Washington, relieving E. B. English, who as a newcomer to Peoria will manage the federal and state sales. H. H. Howard, to be manager of the engine sales division.

Nordberg Manufacturing Co., Milwaukee, Wis., recently announced that The Edward R. Bacon Co., San Francisco, Calif., will represent it in the sale of cone crushers, screens and classifiers in the northern half of California and the entire state of Nevada. It will continue to maintain its Los Angeles Office in the Subway Terminal Building.

The Tractor & Equipment Co., Chicago, Ill., announces: the appointment of Richard Slade, foreman in charge of service department of the company's new branch office at 2272 S. 7th St., Springfield, Ill.; that "Rusty" Knudtson, salesman, formerly with headquarters in DeKalb, has been transferred to the Chicago office; also that Willis A. Girton, Indianapolis, Ind., who has recently became affiliated with the organization, will have charge of the territory east and north of Peoria, Ill.

A Haiss Belt Conveyor
in its class

is just as outstanding in quality as a Haiss Loader. SEE BULLETIN 1127 for proof of its simple, strong, HIGH GRADE construction—at a price you can afford. Low receiving end is ideal for unloading hopper-bottom cars.

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Any length to 60 feet.

Write, Wire or Telephone

HAISS

George Haiss Mfg. Co., Inc., Park Ave. & 143rd St., New York

Who, for over 40 years, have created and sold none but equipment of demonstrable superiority in design and manufacture.

Portable Conveyors—Bucket Loaders

Prices Bid—Contracts Let

OLNEY, ILL.: Stanley Dees, Oblong, Ill., was low bidder for 5000 cu. yd. of gravel for township roads at 48c per cu. yd., f.o.b., pit ($1 for truck delivery).

• • •

FALL RIVER, MASS.: Montaup Sand and Gravel Co. awarded contract to supply department of public works screened sand at 97c per cu. yd.

• • •

OKLAHOMA CITY, OKLA.: Southern Rock Asphalt Co. and Barndollar and Crosbie Co. awarded contracts for rock asphalt at $4.25 per ton.

• • •

WARREN, OHIO: County commissioners have contracted with Standard Slag Co. and Carnegie-Illinois Steel Co. for 50,000 tons of bank slag for 40c per ton.

• • •

LOS ANGELES, CALIF.: Metropolitan Water District awarded contract for 425,000 bbl. of portland cement for Colorado River Aqueduct to low bidder, Monolith Portland Cement Co., at $1.19 per bbl. Contract provides option to buy 103,000 bbl. more at same price.

• • •

OAKLAND, CALIF.: East Bay Municipal Utility District let contract for 625 tons of quick lime and hydrate to Diamond Springs Lime Co. at $18.94 per ton.

• • •

DENVER, COLO.: U. S. Bureau of Reclamation let contract for 20,000 bbl. of portland cement for Fresno Dam—Milk River project to Three Forks Portland Cement Co. at $2.67 per bbl.

• • •

ALBANY, N. Y.: State Department of Public works bought 264 bbl. of Universal Atlas Cement Co. white cement, delivered at Maplewood, N. Y., at approximately $5.70 per bbl.

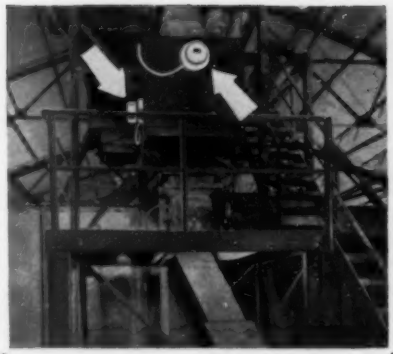
Big Contract

YAKIMA SAND AND GRAVEL CO., Yakima, Wash., has been awarded contract for 73,000 tons of sand and gravel for the Roza project of the U. S. Reclamation Service.

Concrete Pavement Yardage

AWARDS of concrete pavement for June, 1937, have been announced by the Portland Cement Association as follows:

Type of Construction	Sq. yd. awarded during June, 1937	Total sq. yd. for year to date July 3, 1937
Roads	4,860,959	20,366,608
Streets	1,621,631	6,065,258
Alleys	92,512	230,392
Total	6,575,102	26,662,258



BIN-DICATORS

Provide Automatic Control of Flow of Materials » » » »

H. E. Millard installed BIN-DICATORS throughout the plant on all the smaller capacity bins which are filled and emptied frequently. These instruments indicate the level of material and automatically control elevating and conveying machinery in response to fluctuating bin levels.

Illustrated in the photograph are two BIN-DICATORS mounted on the quicklime surge bin above the feeder to the hydrator. (The BIN-DICATORS automatically maintain the level of material between two predetermined points, thereby assuring a continuous even flow of lime to the feeder.)

BIN-DICATORS are a modern necessity in every plant where bulk materials are stored, conveyed, blended, processed, weighed or sacked.

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Write for Bulletin A-40

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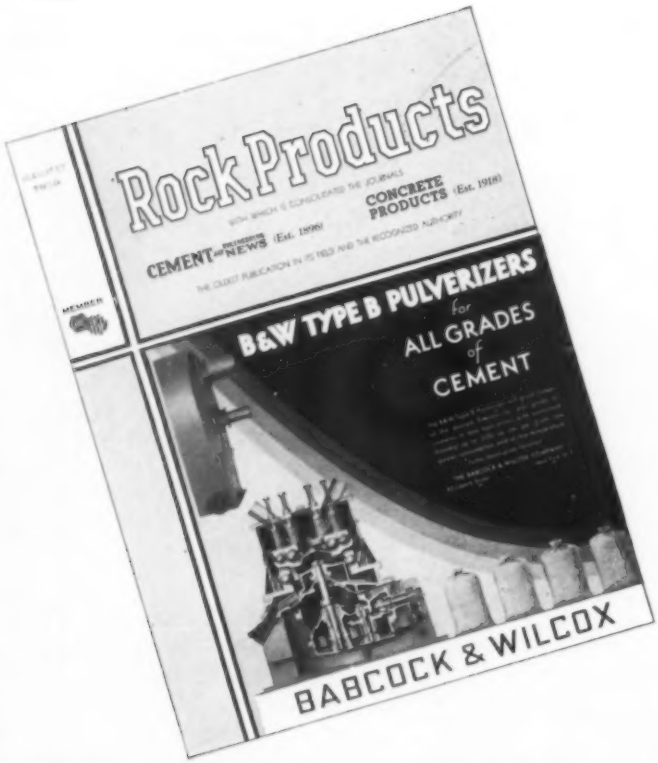
THE BIN-DICATOR CO.
14615 E. Jefferson Ave.
Detroit, Michigan



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Just this . . . through ONE publication you who supply equipment for our great industry can reach every worthwhile prospect.

ROCK PRODUCTS' roster of subscribers is a veritable "Who's Who" of the Rock Products Industry. They are the key men, the men who make the decisions and buy the equipment and supplies. Every branch is covered, cement, lime, crushed stone, sand and gravel, gypsum, slag and other non-metallic minerals.

Concentrate your primary advertising program in ROCK PRODUCTS and reach this most lucrative best-prospect market.

Let us show you how completely ROCK PRODUCTS covers the entire industry and how it will open the door to increased sales.

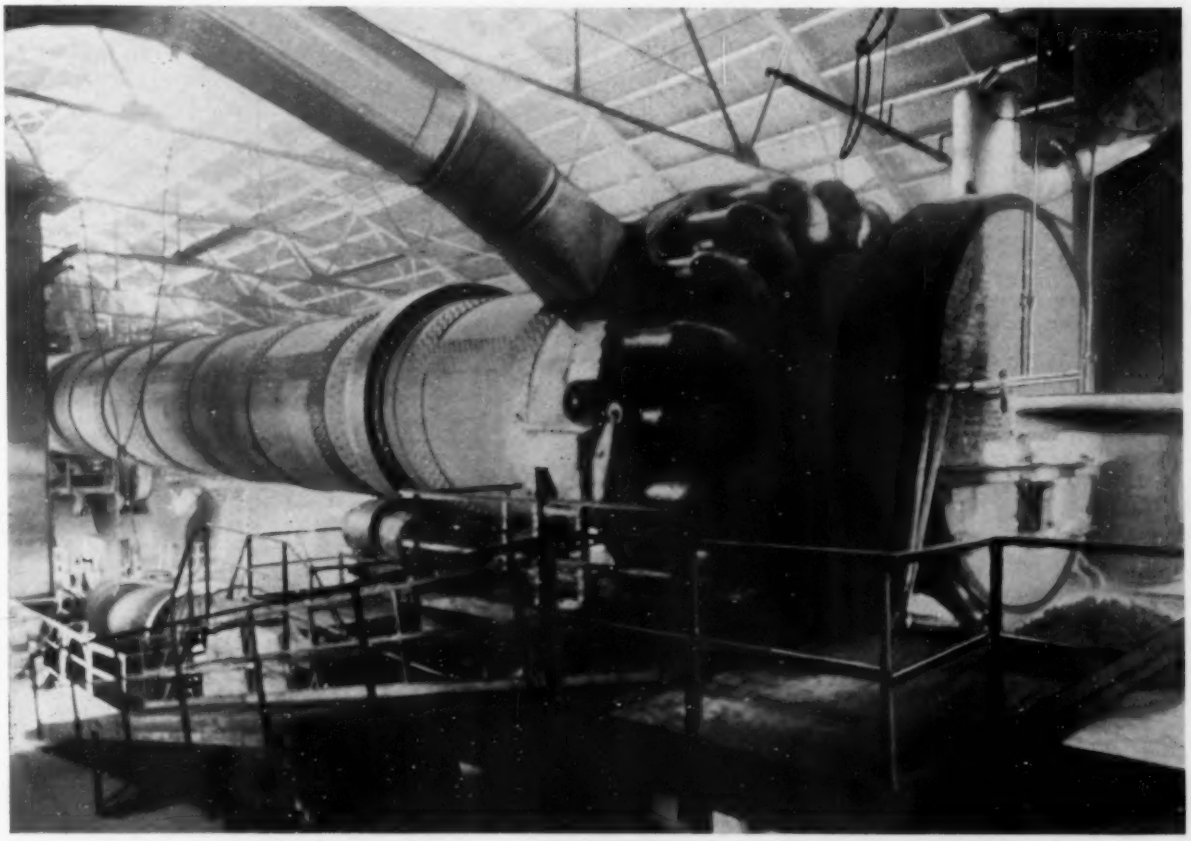
ROCK PRODUCTS

205 W. WACKER DRIVE **CHICAGO, ILLINOIS**

THE VANDERWERP RECUPERATOR

(patented)

for Rotary Kilns



Correct in Principle ● **Proved in Practice**

With the VANDERWERP RECUPERATOR, clinker with maximum allowable magnesia content can be produced having no delayed unsoundness characteristics,

And

the economies it effects return the installation cost in a short period of time,

Because extremely rapid air quenching, and the maximum of heat recovery, are obtained by having the heat exchange between clinker and combustion air take place within the kiln.

Write, without obligation, for full particulars

MANITOWOC ENGINEERING WORKS

Division of

Manitowoc Ship Building Company

GENERAL OFFICES AND PLANT
Manitowoc, Wisconsin

CHICAGO OFFICE
131 E. River St.

Classified Directory of Advertisers in this Issue of ROCK PRODUCTS

For alphabetical index, see page 136

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Airveyer
Fuller Co.

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Bagging Machinery
The Valve Bag Company

Bags (Paper)
The Valve Bag Company

Balls, Grinding, (See Grinding Balls)

Balls (Tube Mill, etc.)
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Bar Benders and Cutters
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Jaeger Machine Co.

Bearings
Chain Belt Co.
Link-Belt Co.
Standard Pressed Steel Co.
Timken Roller Bearing Co.

Bearings (Anti-Friction)
Standard Pressed Steel Co.
Timken Roller Bearing Co.

Bearings (Roller)
Timken Roller Bearing Co.

Bearings (Tapered Roller)
Timken Roller Bearing Co.

Bearings (Thrust)
Timken Roller Bearing Co.

Belt Fasteners
Flexible Steel Lacing Co.

Belting
L. H. Gilmer Co.
Robins Conveying Belt Co.
Thermoid Rubber Co.

Belt Lacing (Steel)
Flexible Steel Lacing Co.

Belting (Elevator and Conveyor)
B. F. Goodrich Co.
Goodyear Tire & Rubber Co., Inc.
Thermoid Rubber Co.

Belting (Transmission)
L. H. Gilmer Co.
B. F. Goodrich Co.
Goodyear Tire & Rubber Co., Inc.
Thermoid Rubber Co.

Belting (V Type)
L. H. Gilmer Co.
B. F. Goodrich Co.
Goodyear Tire & Rubber Co., Inc.
Thermoid Rubber Co.

Bin-Dicator
The Bin-Dicator Company

Bins
Universal Road Machinery

Bins (Steel)
Kennedy-Van Saun Mfg. & Engr. Corp.
Pioneer Gravel Equipment Mfg. Co.

Bin Gates
Allen-Sherman-Hoff Co.
Fuller Co.
Geo. Haiss Mfg. Co., Inc.
Industrial Brownhoist Corp.
Kennedy-Van Saun Mfg. & Engr. Corp.
Link-Belt Co.
Universal Road Machinery

Bins (Cement, etc.)
The M. A. Long Co.

Bins, Hoppers
Besser Mfg. Co.
Blaw-Knox Co.

Bins, Storage (Steel)
Besser Mfg. Co.

Blasting Cap Protectors
B. F. Goodrich Co.

Blasting Machines
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Blasting Supplies
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Blasting Powder (See Powder, Blasting)

Block Machines, Building
Anchor Concrete Machinery Co.
Besser Mfg. Co.
Stearns Mfg. Co.

Block Machines, Silo
Besser Mfg. Co.

Blocks (Pillow, Roller Bearing)
Link-Belt Co.
Standard Pressed Steel Co.
Timken Roller Bearing Co.

Blocks (Sheave)
American Manganese Steel Co.

Blowers
Buffalo Forge Company
W. W. Sly Mfg. Co.

Boilers
Babcock & Wilcox Co.
Combustion Engineering Corp.

Bolts
Standard Pressed Steel Co.

Books (Engineering & Technical)
Lincoln Electric Co.

Boots and Shoes
B. F. Goodrich Co.

Box Car Loading Machinery
Manierre Engineering & Machinery Co.

Brake Lining (Asbestos)

Breakers (Primary)
Smith Engineering Works
Traylor Engineering & Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Brick Machines
Besser Mfg. Co.

Buckets (Clamshell, Grab, Orange Peel, etc.)
Blaw-Knox Co.
Geo. Haiss Mfg. Co., Inc.
Hayward Company
Industrial Brownhoist Corp.
Link-Belt Co.
Owen Bucket Co.
Wellman Engineering Co.

Buckets (Dragline Cableway)
Pioneer Gravel Equipment Mfg. Co.

Buckets (Dragline and Slackline)
American Manganese Steel Co.
Blaw-Knox Co.
Bucyrus-Erie Co.
Owen Bucket Co.
Page Engineering Co.
Wellman Engineering Co. (G. H. Williams)

Buckets (Dredging and Excavating)
Geo. Haiss Mfg. Co., Inc.
Owen Bucket Co.

Buckets (Elevator and Conveyor)
Cross Engineering Co.
Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Jeffrey Mfg. Co.
Link-Belt Co.
Pettibone Mulliken Corp.
Pioneer Gravel Equipment Mfg. Co.
Robins Conveying Belt Co.
Taylor-Wharton Iron & Steel Co.

Bulldozers
Blaw-Knox Co.
Koehring Co.

Cableways
Broderick & Bascom Rope Co. (Yellow Strand)
General Electric Co.
Link-Belt Co.
John A. Roebling's Sons Co.
Sauerman Bros.
Wellman Engineering Co. (G. H. Williams)
Williamsport Wire Rope Co.

Cable (Welding)
Lincoln Electric Co.

Calcinators
Bradley Pulverizer Co.
Traylor Engineering & Mfg. Co.

Calcining Kettles (Gypsum)

Cap Crimpers and Fuse Cutters
Ensign-Bickford Co.

Caps (Blasting)
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Car Movers (Freight)
Appleton-Atlas Car Mover Corp.

Car Pullers
Link-Belt Co.

Carriers

Cars (Dump)

Cars and Track, Industrial
Besser Mfg. Co.

Castings
Babcock & Wilcox Co.
Birdsboro Steel Fdry. & Mach. Co.
C. G. Buchanan Co., Inc.
Chicago Steel Foundry Co.
Eagle Iron Works (Grey Iron)
Kennedy-Van Saun Mfg. & Engr. Corp.
Link-Belt Co.
Timken Roller Bearing Co.

Cement Making Machinery
F. L. Smidth & Co.
Manitowoc Engineering Works
Traylor Engineering & Mfg. Co.

Cement Paints
Tamms Silica Co.

Cement Process
Cement Process Corp.

Cement Pumps
Fuller Co.
F. L. Smidth & Co.

Central Mixing Plants (Concrete)
Blaw Knox Co.
Jaeger Machine Co.

Chain (Dredge and Steam Shovel)
Bucyrus-Erie Co.
Jeffrey Mfg. Co.

Chain (Elevating and Conveying)
American Manganese Steel Co.
Jeffery Mfg. Co.
Link-Belt Co.
Pettibone Mulliken Corp.

Chain Systems (Kilns)
F. L. Smidth & Co.

Chimney Block Machines and Molds
Besser Mfg. Co.

Chutes and Chute Liners
American Manganese Steel Co.
Earl C. Bacon, Inc.
Cross Engineering Co.

Chute or Launder Lining
Goodyear Tire & Rubber Co., Inc.

Clarifiers
The Dorr Co.
Hardinge Co., Inc.

Classifiers
The Dorr Co.
Hardinge Co., Inc.
Kennedy-Van Saun Mfg. & Engr. Corp.
Link-Belt Co.
Nordberg Manufacturing Co.

Clips (Wire Rope)
Broderick & Bascom Rope Co. (Yellow Strand)
Williamsport Wire Rope Co.

Coal Crushers and Rolls
Williams Patent Crusher & Pulv. Co.

Coal Pulverizing Equipment
Babcock & Wilcox Co.
Bradley Pulverizer Co.
Gruendler Crusher & Pulv. Co.
Hardinge Company, Inc.
Kennedy-Van Saun Mfg. & Engr. Corp.
Pennsylvania Crusher Co.
Raymond Pulverizer Division
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.

Collars (Shafting)
Standard Pressed Steel Co.

Colors, Cement
Geo. S. Mepham Corp.
Tamms Silica Co.

Compressed Air Hoists
Gardner-Denver Co.

Compressed Air Rock Drills
Cleveland Rock Drill Co.
Gardner-Denver Co.

Compressors (See Air Compressors)

Concentrators (Slurry, etc.)
The Dorr Co.

Concrete Slab Raising Equipment (Mud-Jack)
Koehring Co.

Consultants on Lime Production
Arnold & Son

Contractors & Builders
The M. A. Long Co.

Conveyor Belting (See Belting)

Conveyor Idlers and Rolls
C. O. Bartlett & Snow Co.
Jeffrey Mfg. Co.
Link-Belt Co.

Conveyors and Elevators
Allen Sherman Hoff Co.
Earle C. Bacon
Besser Mfg. Co.
Fuller Company
Geo. Haiss Mfg. Co., Inc.
Industrial Brownhoist Corp.
Jeffrey Mfg. Co. (Vibrating)
Kennedy-Van Saun Mfg. & Engr. Corp.
Lewistown Fdy. & Mach. Co.
Link-Belt Co.
Pioneer Gravel Equipment Mfg. Co.
Robins Conveying Belt Co.
F. L. Smidth & Co.
Smith Engineering Works
Sturtevant Mill Co.
Universal Road Machinery
Williams Patent Crusher & Pulv. Co.

...with the right GULF LUBRICANTS on the job,"

SAYS PLANT MANAGER.

"Nine years without bearing trouble on our wet mills has convinced us," says this cement mill manager. "Gulf lubricants do a real job!"

A Gulf engineer can help you make sure you're getting a *real lubrication job* in your mill. His experience has included scores of plants, and when he recommends a certain grease or a certain oil for a bearing, *you know it is the right lubricant for that requirement!*

Economies—in maintenance and power costs—almost always accompany this careful attention to lubrication. The Gulf engineer's services are available to every mill operator from Maine to Texas. Talk with the Gulf man when he calls.

Gulf Oil Corporation GULF INDUSTRIAL LUBRICATION **Gulf Refining Company**

GENERAL OFFICES: GULF BUILDING, PITTSBURGH, PA.

MAKERS OF GULF NO-NOX ETHYL GASOLINE AND GULFPRIDE OIL

STOP DUST!

SIMPLICITY OF DESIGN.
LOW IN FIRST COST AND OPERATING COST.
YEARS OF DEPENDABLE SERVICE.

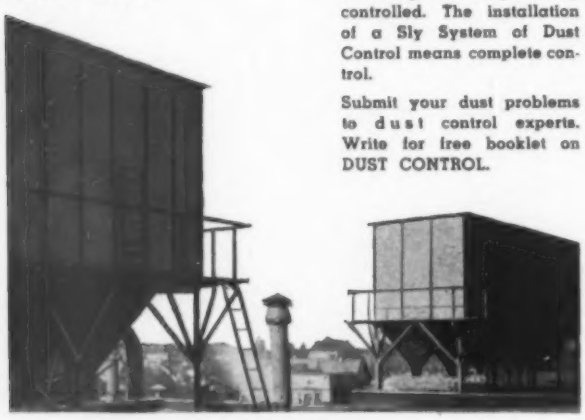
SLY DUST CONTROL

THOUSANDS OF INSTALLATIONS SINCE 1899

The simplest way to eliminate a dust nuisance is to provide a means of controlling it where it is being created.

Why allow the atmosphere of your entire plant to be polluted by dust created at a few points where it may be easily and inexpensively controlled. The installation of a Sly System of Dust Control means complete control.

Submit your dust problems to dust control experts. Write for free booklet on DUST CONTROL.



CLOTH BAG
SLY Dust Filters
FOR DUST CONTROL
SUPPRESSION···POSITIVE COLLECTION···DISPOSAL

THE W.W. SLY MANUFACTURING CO.
4726 Train Ave., Cleveland, Ohio

Classified Directory—*Continued*

Conveyors (Pneumatic)
Fuller Company

Conveyors (Screw)
Link-Belt Co.

Conveyors (Spiral)
Jeffrey Mfg. Co.

Correcting Basins
F. L. Smidth & Co.

Couplings (Air Hose)
Cleveland Rock Drill Co.

Couplings (Flexible and Shaft)
Link-Belt Co.
Standard Pressed Steel Co.

Couplings (Hose, Pipe, etc.)
B. F. Goodrich Co.

Cranes (Clamshell)
Bucyrus-Erie Co.
Koehring Co.
Manitowoc Engineering Works

Cranes (Crawler and Locomotive)
Bucyrus-Erie Co.
Harnischfeger Corp.
Industrial Brownhoist Corp.
Koehring Co.
Lima Locomotive Works, Inc.
Link-Belt Co.
Manitowoc Engineering Works
Northwest Engineering Co.
Thew Shovel Co. (Electric, Gasoline and Steam)

Cranes (Excavator)
Koehring Co.

Cranes (Overhead Traveling Electric)
Industrial Brownhoist Corp.

Crusher Parts
American Manganese Steel Co.
American Pulverizer Co.
Birdsboro Steel Fdry. & Mach. Co.
Kennedy-Van Saun Mfg. & Engr. Corp.
C. G. Buchanan Co., Inc.
Pennsylvania Crusher Co.
Traylor Engineering & Mfg. Co.

Crusher Parts (Manganese)
Taylor-Wharton Iron & Steel Co.

Crushers (Hammer)
The C. O. Bartlett & Snow Co.
Dixie Machy. Mfg. Co.
Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
Pennsylvania Crusher Co.
Sturtevant Mill Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Jaw and Gyratory)
Allis-Chalmers Mfg. Co.
Earle C. Bacon, Inc.
Birdsboro Steel Foundry & Mach. Co.
C. G. Buchanan Co., Inc.
Good Roads Machinery Corp.
Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
Lewistown Fdy. & Mach. Co. (Jaw)
New Holland Machine Co.
Nordberg Mfg. Co.
Pennsylvania Crusher Co.
Pioneer Gravel Equipment Mfg. Co.
Smith Engineering Works
Universal Road Machinery
Williams Patent Crusher & Pulv. Co.

Crushers (Reduction)
Earle C. Bacon, Inc.
Birdsboro Steel Fdry. & Mach. Co.
C. G. Buchanan Co., Inc.
Jeffrey Mfg. Co.
Traylor Engineering & Mfg. Co.

Crushers (Ring)
American Pulverizer Co.

Crushers (Roll)
American Pulverizer Co.
Gruendler Crusher & Pulv. Co.
New Holland Machine Co.
Pioneer Gravel Equipment Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Crushers (Rotary)
American Pulverizer Co.

Crushers (Single Roll)
American Pulverizer Co.
Gruendler Crusher & Pulv. Co.
Jeffrey Mfg. Co.
Link-Belt Co.
McLanahan & Stone Corp.
New Holland Machine Co.
Pennsylvania Crusher Co.

Crushing Rolls
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Birdsboro Steel Foundry & Mach. Co.
C. G. Buchanan Co., Inc.
Jeffrey Mfg. Co.
New Holland Machine Co.
Pettibone Mulliken Corp.
Sturtevant Mill Co.

Dedusters
Blaw-Knox Co.

Detonators
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Dewatering Machines
The Dorr Co.

Diaphragms (Pump)
B. F. Goodrich Co.

Dippers & Teeth
Pettibone Mulliken Corp.

Dippers and Teeth (Steam Shovel)
American Manganese Steel Co.
Bucyrus-Erie Co.
The Frog, Switch & Mfg. Co.
Thew Shovel Co.

Dipper Teeth (Manganese)
Taylor-Wharton Iron & Steel Co.

Dirt Moving Equipt. (Dumptor)
Koehring Co.

Ditchers
Bucyrus-Erie Co.

Draft Apparatus
Buffalo Forge Company

Draglines
Bucyrus-Erie Co.
Link-Belt Co.
Manitowoc Engineering Works
Northwest Engineering Co.
Page Engineering Co.
Thew Shovel Co.

Draglines (Gasoline or Electric)
Koehring Co.
Manitowoc Engineering Works

Dragline Cableway Excavators
Bucyrus-Erie Co.
Link-Belt Co.
Sauerman Bros., Inc.

Dragline Excavators
Bucyrus-Erie Co.
Lima Locomotive Works, Inc.
Northwest Engineering Co.
Page Engineering Co.

Dragline Excavators (Electric, Gasoline & Steam)
Thew Shovel Co.

Dredge Pumps (See Pumps, Dredging)

Dredges
Bucyrus-Erie Co.
Hayward Co.
Hetherington & Berner, Inc. (Complete Steel)
Morris Machine Works

Dredging Sleeves
B. F. Goodrich Co.
Thermoid Rubber Co.

Drill Bits
Timken Roller Bearing Co.

Drilling Accessories
Cleveland Rock Drill Co.

Drill Steel
Cleveland Rock Drill Co.

Drills
Bucyrus-Erie Co.
Buffalo Forge Company
Timken Roller Bearing Co.

Drills, Hammer (See Hammer Drills)

Drills (Rock)
Cleveland Rock Drill Co.

Drills (Tripod)
Cleveland Rock Drill Co.

Drills (Wagon)
Cleveland Rock Drill Co.

Drives (Short Center)
Allis-Chalmers Mfg. Co.
Earle C. Bacon, Inc.

Dryers
Allis-Chalmers Mfg. Co.
Babcock & Wilcox Co.
Combustion Engineering Corp.
Hardinge Company, Inc.
Kennedy-Van Saun Mfg. & Engr. Corp.
Manitowoc Engineering Works
W. S. Tyler Co.

Dumptors
Koehring Co.

Classified Directory—*Continued*

Dust Arrestors
Parsons Engineering Corp.
W. W. Sly Mfg. Co.
Western Precipitation Co.

Dust Collecting Systems
Allen Sherman Hoff Co.
Allis-Chalmers Mfg. Co.
The C. O. Bartlett & Snow Co.
Blaw Knox Co.
Pettibone Mulliken Corp.

Dust Conveying Systems
Fuller Company
Western Precipitation Co.

Dynamite
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Electric Cables and Wires
John A. Roebling's Sons Co.

Electric Mine Hoists
Nordberg Mfg. Co.

Electric Power Equipment
Allis-Chalmers Mfg. Co.
General Electric Co.

Electrode Holders (Welding)
Lincoln Electric Co.

Electrodes (Welding)
Lincoln Electric Co.

Elevator Belting (See Belting)

Emery Mills
Sturtevant Mill Co.

Engineers
The Dorr Co.
Fuller Co.
Hetherington & Berner, Inc.
Kennedy-Van Saun Mfg. & Engr. Corp.
The M. A. Long Co.
Productive Equipment Corp.
Robins Conveying Belt Co.
F. L. Smidth & Co.
Sturtevant Mill Co.
Traylor Engineering & Mfg. Co.
Williams Patent Crusher & Pulv. Co.

Engines (Diesel)
National Supply Company
Nordberg Mfg. Co.

Excavating Machinery (See Shovels, Cranes, Buckets, etc.)

Excavators (Crawling Tractor)
Koehring Co.

Excavators (Dragline)
Koehring Co.

Explosives
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Fans
Buffalo Forge Company
General Electric Co.

Fans (Exhaust)
Parsons Engineering Corp.
W. W. Sly Mfg. Co.

Feeders
Babcock & Wilcox Co. (Pulverized Coal)
Barle C Bacon, Inc.
Besser Mfg. Co.
Fuller Co. (Cement and Pulverized Material)
Hardinge Company, Inc. (Weighing)
Jeffrey Mfg. Co. (Pan & Tube)
Kennedy-Van Saun Mfg. & Engr. Corp.
Pioneer Gravel Equipment Mfg. Co.
Robins Conveying Belt Co.
Smith Engineering Works (Plate)
Stearns Mfg. Co.
Traylor Engineering & Mfg. Co.

Feeders, Weighing
Schaffer Poidometer Co.

Filters (Air)
W. W. Sly Mfg. Co.

Filters (Dust)
W. W. Sly Mfg. Co.

Forges
Buffalo Forge Company

Forges (Oil)
Gardner-Denver Co.

Forgings
Taylor-Wharton Iron & Steel Co.

Frogs & Switches
Taylor-Wharton Iron & Steel Co.

Furnaces
Combustion Engineering Corp.

Fuses
General Electric Co.

Fuses (Detonating and Safety)
Ensign-Bickford Co.

Gaskets
B. F. Goodrich Co.
Goodyear Tire & Rubber Co., Inc.

Gasoline
Texas Company

Gears (Spur, Helical and Worm)
Jeffrey Mfg. Co.
Taylor-Wharton Iron & Steel Co.

Gears and Pinions
General Electric Co.
Link-Belt Co.
Pettibone Mulliken Corp.
Taylor-Wharton Iron & Steel Co.

Gelatin and Semi-Gelatin (See Explosives)

Generators (Arc Welding)
Lincoln Electric Co.

Goggles (Welding)
Lincoln Electric Co.

Grapples
Blaw Knox Co.
Hayward Co.
Owen Bucket Co.

Grease
Gulf Refining Co.
Texas Company

Grinding Balls
Babcock & Wilcox Co.
Jeffrey Mfg. Co.
Kennedy-Van Saun Mfg. & Engr. Corp.

Grizzlies
American Manganese Steel Co.
Jeffrey Mfg. Co. (Vibrating)
Kennedy-Van Saun Mfg. & Engr. Corp.
Pettibone Mulliken Corp.
Robins Conveying Belt Co.
Smith Engineering Works

Grizzly Feeders
Jeffrey Mfg. Co.
Traylor Engr. & Mfg. Co.

Hammer Drills
Cleveland Rock Drill Co.

Hammer Mills (See Crushers)

Heating Apparatus
Buffalo Forge Company

Heat-Treating Furnaces
Leeds & Northrup Co.

Hoists
Jaeger Machine Co.
Link-Belt Co.
Northwest Engineering Co.
Pioneer Gravel Equipment Mfg. Co.

Hose (Water, Steam, Air Drill, Pneumatic, Sand Suction and Discharge)
Cleveland Rock Drill Co.
B. F. Goodrich Co.
Goodyear Tire & Rubber Co., Inc.
Thermoid Rubber Co.

Hose Couplings (See Couplings—Hose, Pipe, etc.)

Hydrators
Blaw-Knox Co.

Indicators (Bin)
The Bin-Dicator Company

Insulation (Electric)
General Electric Co.

Kilns (Shaft)
Arnold & Son
Hardinge Company, Inc

Kilns and Coolers (Rotary
Allis-Chalmers Mfg. Co.
Blaw-Knox Co.
Hardinge Co., Inc.
Kennedy-Van Saun Mfg. & Engr. Corp.
Manitowoc Engineering Works
F. L. Smidth & Co.

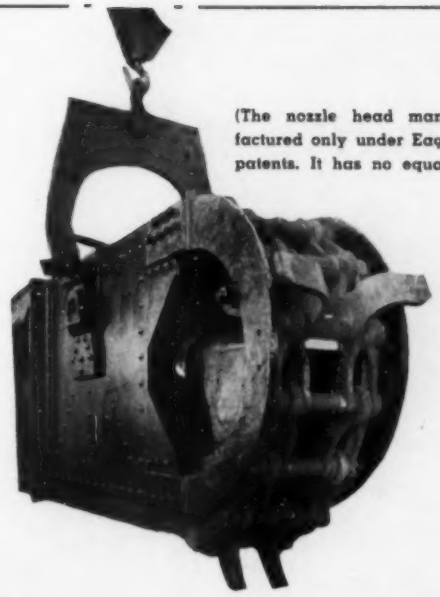
Kominuters (See Mills)

Laboratory Crushers
Sturtevant Mill Co.
Williams Patent Crusher Pulv. Co.

Lamp Guards
Flexible Steel Lacing Co.

Lens (Arc Welding)
Lincoln Electric Co.

Lighters, Hot Wire (For Safety Fuse)
Ensign-Bickford Co.



(The nozzle head manufactured only under Eagle patents. It has no equal.)

IN A CLASS BY THEMSELVES FOR LOWERING PRODUCTION COSTS . . *EAGLE*

"SWINTEK" SCREEN NOZZLE LADDER

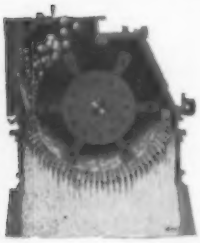
They pump more solid material—lower cost of material produced — and show surprising increase in production over plain suction with operating costs often reduced by more than 50%.

The cutters loosen deposit, insure uniform feed of solids, eliminate pumping delays, at the same time carrying oversize up the ladder as the endless chain passes over the nozzle acting as a screen.

Send for descriptive bulletin covering the many outstanding advantages of the Eagle "Swintek". Also ask for particulars for the cleaning of Sand and Gravel.

EAGLE IRON WORKS
DES MOINES, IOWA

Reduce Material Enlarge Profits



WITH

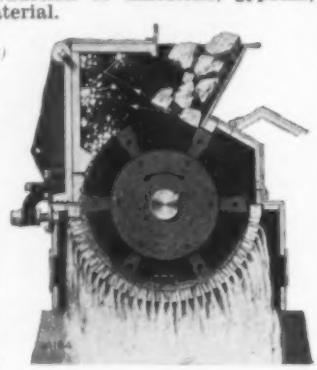
Jeffrey Pulverizers and Crushers

●

Type A—for average requirements and moderate capacities in the reduction of limestone, gypsum, coal, shale and similar material.

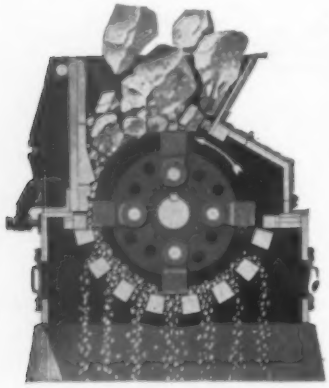
●

(Patented)



Type B—for finer reduction, break-down and heavier work. Jeffrey swing hammer pulverizers have the unique feature of reducing through a series of distinct steps (see illustration), the greater part of the reduction being done in the upper chamber before the material reaches the screen bars. This method results in a substantial power saving, less maintenance, increased capacity and more uniform product.

●



Miracle hammer crushers—designed for the reduction of large pieces and large capacities of limestone, shale, slag and cement rock. Will take steam shovel size limestone, reducing it into pieces 1", 2", 3" or 4" and under, in one operation. Here again a saving is made, for this machine does the work of two or more crushers of other types.

Jeffrey miracle hammer crushers are supplied with either heavy cast iron frames or with armorplate steel with manganese steel liners. For a product of more than ordinary uniformity, this unit can be furnished with an adjustable screen cage.

Jeffrey reduction units will give you many years of dependable service. Many satisfied users say that they have found them superior to any on the market today. With 44 years' experience . . . we are in a position to select the right machine to reduce your operating costs and to improve your product.

The Jeffrey Manufacturing Company

935-99 North Fourth St., Columbus, Ohio

New York	Boston	Chicago	Denver
Buffalo	Scranton, Pa.	Huntington, W. Va.	Dallas
Philadelphia	Cincinnati	Milwaukee	Salt Lake City
Pittsburgh	Cleveland	Terre Haute, Ind.	Birmingham
	Detroit	St. Louis	

Jeffrey Manufacturing Co., Ltd. of Canada
Head Office and Works: Montreal—Branch Offices: Toronto, Calgary, London

Classified Directory—*Continued*

Lime Handling Equipment
Fuller Company
Hardinge Co., Inc.
Link-Belt Co.
Raymond Pulverizer Division

Lime Kilns (See Kilns and Coolers, Rotary)

Linings (Iron for Ball and Tube Mills) (See Mill Liners)

Linings (Rubber for Chutes, Ball and Tube Mills, Tank and Pipe)
B. F. Goodrich Co.

Loaders and Unloaders
Bucyrus-Erie Co.
Fuller Company
Geo. Haiss Mfg. Co., Inc.
Jeffrey Mfg. Co.
Link-Belt Co.
Northwest Engineering Co.
Robins Conveying Belt
Universal Road Machinery

Locomotive Cranes (See Cranes, Crawler and Locomotive)

Locomotives (Diesel Electric)
Davenport-Besler Corp.
The Fate-Root-Heath Company

Locomotives (Diesel Mechanical)
Davenport-Besler Corp.

Locomotives (Gas-Electric)
Davenport-Besler Corp.
The Fate-Root-Heath Company
Jeffrey Mfg. Co.

Locomotives (Oil-Electric)
The Fate-Root-Heath Company

Locomotives (Storage Battery)
General Electric Co.
Jeffrey Mfg. Co.

Locomotives (Steam, Gas and Electric
Davenport-Besler Corp.
The Fate-Root-Heath Company
General Electric Co.

Log Washer
McLanahan & Stone Corp.
Smith Engineering Works

Lubricants
Gulf Refining
Texas Company

Lubricants (Wire Rope)
Broderick & Bascom Rope Co. (Yellow Strand)

Machinery Guards
Harrington & King Perf. Co.
W. S. Tyler Co.

Magnets
General Electric Co.

Magnetic Pulleys
Birdsboro Steel Foundry & Mach. Co.
C. G. Buchanan Co., Inc.

Manganese Steel Castings
American Manganese Steel Co.
The Frog, Switch & Mfg. Co.
Pettibone Mulliken Corp.
Taylor-Wharton Iron & Steel Co.

Manganese Steel Parts
American Manganese Steel Co.
Taylor-Wharton Iron & Steel Co.

Manganese Welding Rod
Taylor-Wharton Iron & Steel Co.

Material Handling Equipment
Jeffrey Mfg. Co.

Mechanical Rubber Goods
B. F. Goodrich
Thermoid Rubber Co.

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Leeds & Northrup Co.

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Babcock & Wilcox Co.
Hardinge Company, Inc.
Jeffrey Mfg. Co.
Kennedy-Van Saun Mfg. & Engr. Corp.
F. L. Smidth & Co.
Traylor Engineering & Mfg. Co.

Mills, Grinding (Ball, Tube, etc.) (See also Crushers, Hammer)
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Bradley Pulverizer Co.
Gruendler Crusher & Pulv. Co.
Hardinge Co., Inc.
Kennedy-Van Saun Mfg. & Engr. Corp.
Raymond Pulverizer Division
F. L. Smidth & Co.
Williams Patent Crusher & Pulv. Co.

Mixers (Commercial Concrete)
Jaeger Machine Co.

Mixers (Concrete)
Anchor Concrete Machy. Co.
Besser Mfg. Co.
Gruendler Crusher & Pulv. Co.
Jaeger Machine Co.
Koehring Co.

Mortar Colors
Geo. S. Mepham Corp.
Tamms Silica Co.

Motors and Generators (Electric Units)
Allis-Chalmers Mfg. Co.
General Electric Co.

Nitramon
E. I. du Pont de Nemours & Co., Inc.

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Chain Belt Co.

Nuts (Lock)
Standard Pressed Steel Co.

Oil Burners
Babcock & Wilcox Co.
F. L. Smidth & Co.

Oilers (Air Line)
Gardner-Denver Co.

Oil Forges
Gardner-Denver Co.

Oils (Lubricating)
Gulf Refining Co.
Texas Company

Packings
Goodyear Tire & Rubber Co., Inc.

Packings (Pump, Valve, etc.)
B. F. Goodrich
Thermoid Rubber Co.

Paint (Asphalt)
Texas Company

Pallets
Anchor Concrete Machinery Co.
Besser Mfg. Co.
Commercial Shearing and Stamping Co.
Stearns Mfg. Co.

Pavers (Concrete)
Koehring Co.

Perforated Metal
Chicago Perforating Co.
Cross Engineering Co.
Harrington & King Perf. Co.
Hendrick Mfg. Co.
Joseph T. Ryerson & Son, Inc.

Perforated Metal (Manganese)
Taylor-Wharton Iron & Steel Co.

Pipe Machines
Besser Mfg. Co.

Pipe Molds (Concrete)
Besser Mfg. Co.
Stearns Mfg. Co.

Plants (Crushing)
Good Roads Machinery Corp.
Traylor Engineering & Mfg. Co.

Plants (Sand and Gravel)
Good Roads Machinery Corp.
Traylor Engineering & Mfg. Co.

Plants (Stone Crushing)
Traylor Engineering & Mfg. Co.

Plates (Double Corrugated)
Hendrick Mfg. Co.

Pneumatic Drills (See Drills)

Poidometers
Schaffer Poidometer Co.

Portable Conveyors
Fuller Company
Geo. Haiss Mfg. Co., Inc.
Link-Belt Co.

Portable Crushing and Screening Unit
Pioneer Gravel Equipment Mfg. Co.
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Portable Loaders
Geo. Haiss Mfg. Co., Inc.
Jeffrey Mfg. Co.

Powder (Blasting)
Atlas Powder Co.
E. I. du Pont de Nemours & Co., Inc.

Power Tampers
Besser Mfg. Co.

Classified Directory—*Continued*

Power Transmission Equipment
Standard Pressed Steel Co.

Precipitators, Electrical
Western Precipitation Co.

Pulleys, Magnetic (See Magnetic Pulleys)

Pulverators
Allis-Chalmers Mfg. Co.

Pulverizers (See also Crushers, Mills, etc.)
Allis-Chalmers Mfg. Co.
American Pulverizer Co.
Babcock & Wilcox Co.
Bradley Pulverizer Co.
Dixie Machy. Mfg. Co.
Gruendler Crusher & Pulv. Co.
Hardinge Co., Inc.
Jeffrey Mfg. Co.
New Holland Machine Co.
Pennsylvania Crusher Co.
Raymond Pulverizer Division
F. L. Smidth & Co.
Sturtevant Mill Co.
Traylor Engineering & Mfg. Co.
Universal Road Machinery
Williams Patent Crusher & Pulv. Co.

Pumps (Air Lift)
Fuller Company

Pumps (Cement)
Fuller Company

Pumps (Cement Slurry)
Allen-Sherman Hoff Co.
The Dorr Co.
Morris Machine Works
F. L. Smidth & Co.
A. R. Wilfley & Sons

Pumps (Centrifugal)
Allen-Sherman Hoff Co.
Allis-Chalmers Mfg. Co.
Hetherington & Berner, Inc.
Jaeger Machine Co.
Morris Machine Works
A. R. Wilfley & Sons

Pumps (Dredging)
Allen-Sherman Hoff Co.
Bucyrus-Erie Co.
Morris Machine Works

Pumps (Pulverized Coal)
Babcock & Wilcox Co.

Pumps (Sand and Gravel)
Allis-Chalmers Mfg. Co.
Hetherington & Berner, Inc.
Morris Machine Works
Pettibone Mulliken Corp.
A. R. Wilfley & Sons

Pyrometers
Leeds & Northrup Co.

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Besser Mfg. Co.

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General Electric Co.

Railway Equipment
General Electric Co.

Ready Mixed Concrete Plants
Blaw-Knox Co.
Jaeger Machine Co.

Ready Mixed Concrete (Truck Mixer Bodies)
Blaw-Knox Co.
Jaeger Machine Co.

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Besser Mfg. Co.

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W. W. Sly Mfg. Co.

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Manitowoc Engineering Works

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Austin-Western Road Machinery Co.
Blaw-Knox Co.
Harnischfeger Co.
Koehring Co.
Northwest Engineering Co.

Rock Bits (See Drill Bits)

Rock Drills (See Drills, Rock)

Rod Mills
Hardinge Co., Inc.

Rods (Welding)
Lincoln Electric Co.

Rods (Wire)

Roller Bearings
Timken Roller Bearing Co.

Roofing (Ready to Lay)
Texas Company

Rope, Wire (See Wire Rope)

Rotary Screens (Sections and Segments)
Hendrick Mfg. Co.

Rubber Covered Screens
B. F. Goodrich Co.

Sack Balers
Besser Mfg. Co.

Sand and Gravel Screening and Washing Equipment
Universal Road Machinery

Sandblast Equipment
W. W. Sly Mfg. Co.

Sand Drag
Smith Engineering Works

Sand Separators
Pioneer Gravel Equipment Mfg. Co.

Sand Settling Tanks
Jeffrey Mfg. Co.
Link-Belt Co.
Nordberg Manufacturing Co.
Pioneer Gravel Equipment Mfg. Co.
Smith Engineering Works

Scrapers (Power Drag)
Blaw-Knox Co.
Link-Belt Co.
Northwest Engineering Co.
Pioneer Gravel Equipment Mfg. Co.
Sauerman Bros., Inc.

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Gardner-Denver Co.

Screens
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Earle C. Bacon, Inc.
The C. O. Bartlett & Snow Co.
Besser Mfg. Co.
Chicago Perforating Co.
Cleveland Wire Cloth & Mfg. Co.
Cross Engineering Co.
Hardinge Co., Inc.
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Hendrick Mfg. Co.
Industrial Brownhoist Corp.
Jeffrey Mfg. Co.
Link-Belt Co.
Ludlow-Saylor Wire Co.
New Holland Machine Co.
Nordberg Mfg. Co.
Pioneer Gravel Equipment Mfg. Co.
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Robins Conveying Belt Co.
John A. Roebling's Sons Co.
Simplicity Engineering Co.
Smith Engineering Works
Sturtevant Mill Co.
Universal Road Machinery
Universal Vibrating Screen Co.
Williams Patent Crusher & Pulv. Co.

Screens (Revolving)
Geo. Haiss Mfg. Co., Inc.

Screens, Scalping (Hercules and Standard)
Smith Engineering Works
Williams Patent Crusher & Pulv. Co.

Screens (Perforated
Hendrick Mfg. Co.

Screens (Testing)
Hendrick Mfg. Co.

Screens (Vibrating)
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Jeffrey Mfg. Co.
Link-Belt Co.
Nordberg Mfg. Co.
Pioneer Gravel Equipment Mfg. Co.
Robins Conveying Belt Co.
Simplicity Engineering Co.
Smith Engineering Works
Sturtevant Mill Co.
W. S. Tyler Co.
Universal Vibrating Screen Co.
Williams Patent Crusher & Pulv. Co.

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Besser Mfg. Co.

Screw Rewasher (Single and Twin)
Smith Engineering Works

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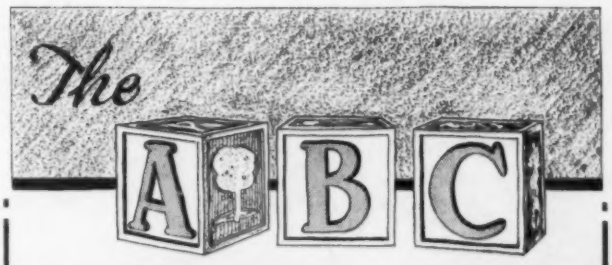
Earle C. Bacon, Inc.
Hardinge Company, Inc.
Lewistown Fdy. & Mach. Co.
Smith Engineering Works
Traylor Engineering & Mfg. Co.



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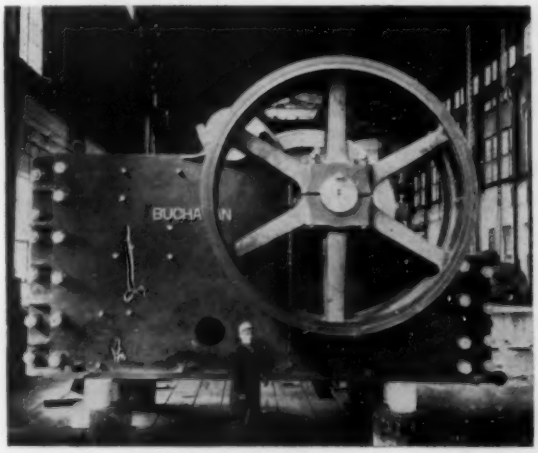

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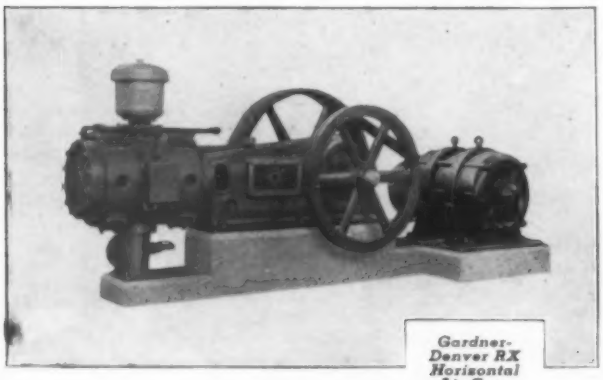

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Thew Shovel Co.

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Harnischfeger Corp.
Industrial Brownhoist Corp.
Koehring Co.
Lima Locomotive Works, Inc. (Ohio Power Shovel Co.)
Link-Belt Co.
Manitowoc Engineering Works
Northwest Engineering Co. (Crawling Tractor)

Shovel Repair Parts (Manganese)
Taylor-Wharton Iron & Steel Co.

Shovels (Steam, Gas & Elec.)
Thew Shovel Co. (Crawling Tractor)

Silos
The M. A. Long Co.
F. L. Smidth & Co.

Skip Hoists and Skips
Link-Belt Co.

Slings (Wire Rope)
American Cable Co., Inc.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

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Mica Crystal Co., Inc.
Tamms Silica Co.

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Link-Belt Co.

Sprockets and Chain
Taylor-Wharton Iron & Steel Co.

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Timken Roller Bearing Co.

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Chicago Steel Foundry Co.
Timken Roller Bearing Co.

Steel (Open Hearth)
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Steel (Special Alloy)
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Steel (Special Analysis)
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Steels, Drill (See Drill Steel)

Stokers
Babcock & Wilcox Co.
Combustion Engineering Corp.

Strippers
Besser Mfg. Co.

Stucco Materials
Geo. S. Mepham Corp.

Tanks
Combustion Engineering Corp.
The Dorr Co.
Hendrick Mfg. Co.
Jeffrey Mfg. Co.
Link-Belt Co.

Tanks (Sand Settling)
Pioneer Gravel Equipment Mfg. Co.

Thermometers
Leeds & Northrup Co.

Thickeners
The Dorr Co.
Hardinge Co., Inc.

Tile Machines (Drain)
Besser Mfg. Co.

Tires and Tubes
B. F. Goodrich Co.

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Nordberg Mfg. Co.
Taylor-Wharton Iron & Steel Co.

Track Shifters
Nordberg Mfg. Co.

Tractors
Koehring Co.

Tramways (Aerial Wire Rope)
Broderick & Bascom Rope Co. (Yellow Strand)
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John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Transmission Belting (See Belting)

Transmission Machinery
Allis-Chalmers Mfg. Co.
Timken Roller Bearing Co.

Truck Bodies (Ready Mixed Concrete)
Blaw-Knox Co.
Jaeger Machine Co.

Trucks (Mixers)
Blaw-Knox Co.
Jaeger Machine Co.

Trucks and Trailers (See Motor Trucks)

Tube Mills (See Mills, Ball, Tube, etc.)

Tube Mill Liners (See Mill Liners)

Tubing (Blasting)
B. F. Goodrich Co.

Tubing (Seamless Steel)
Timken Roller Bearing Co.

Underground Loaders
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Underground Shovels
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Unit Coolers
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Buffalo Forge Company

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Valves (Pump)
B. F. Goodrich Co.

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Buffalo Forge Company

Vibrating Screens (See Screens, Vibrating)

Vibrators
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Washers (Sand, Gravel and Stone)
Allis-Chalmers Mfg. Co.
The Dorr Co.
Eagle Iron Works
Gruendler Crusher & Pulv. Co.
Hardinge Copmany, Inc.
Jeffrey Mfg. Co.
Link-Belt Co.
Pioneer Gravel Equipment Mfg. Co.
Traylor Engr. & Mfg. Co.
Universal Road Machinery

Waste Heat Boilers
Combustion Engineering Corp.

Waterproofing
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Weighing Equipment
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Weigh-Mix
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Lincoln Electric Co.

Welding Machines
Lincoln Electric Co.

Welding Machines & Equipment (Electric Arc)
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Welding Rod
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Welding Wire
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Wire Cloth (Manganese)
Taylor-Wharton Iron & Steel Co.

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Cleveland Wire Cloth & Mfg. Co.
Ludlow-Saylor Wire Co. Inc.
John A. Roebling's Sons Co.

Wire Rope
American Cable Co., Inc.
Broderick & Bascom Rope Co. (Yellow Strand)
Hazard Wire Rope Co.
A. Leschen & Sons Rope Co.
John A. Roebling's Sons Co.
Williamsport Wire Rope Co.

Wire Rope Fittings
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Broderick & Bascom Rope Co. (Yellow Strand)
Hazard Wire Rope Co.
A. Leschen & Sons Rope Co.
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Williamsport Wire Rope Co.

Wire Rope Sockets (See Sockets, Wire Rope)

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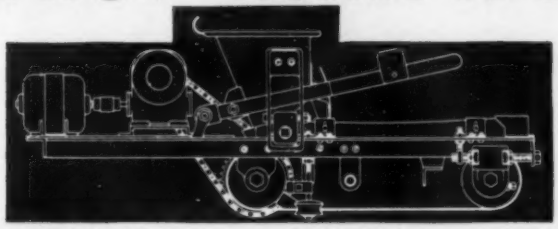

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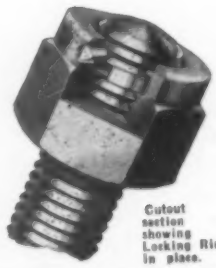

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Fig. 1510

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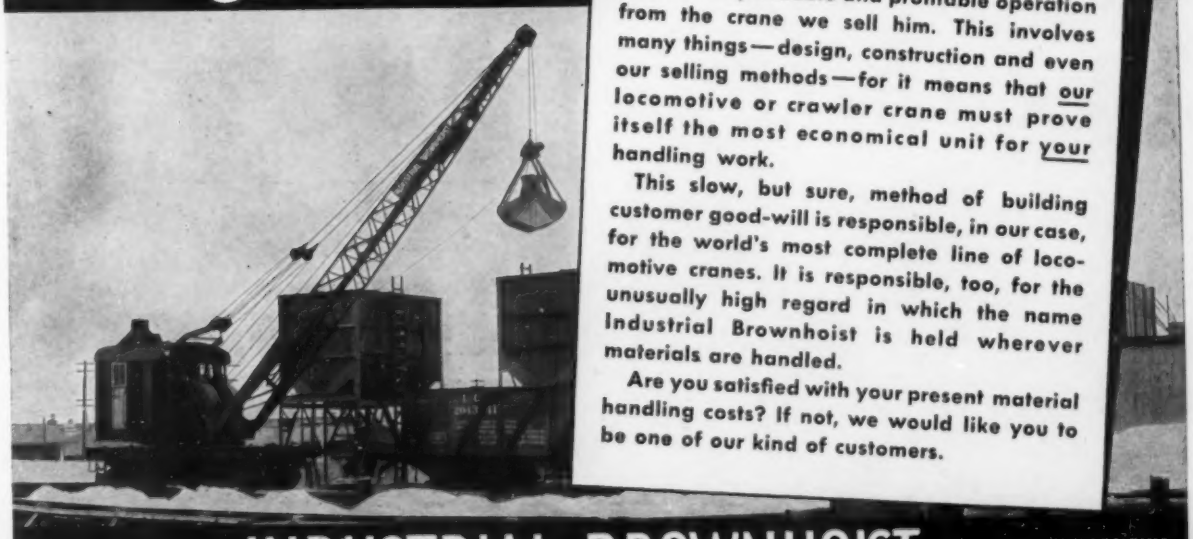

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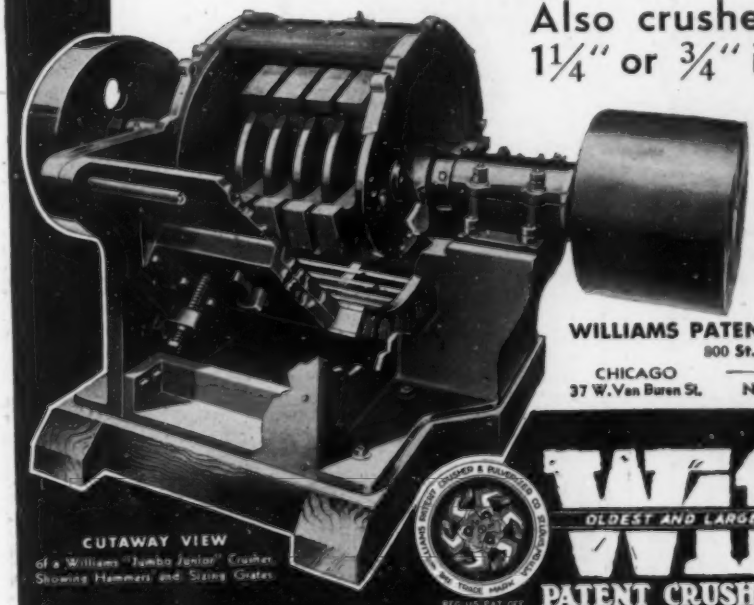

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- **Only a dependable truck mixer can make money for you.**
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- **Investigate Blaw-Knox TRUKMIXERS for your future profits.**

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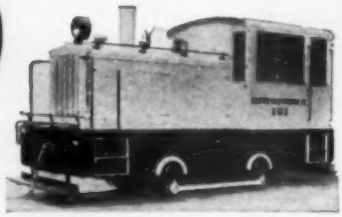

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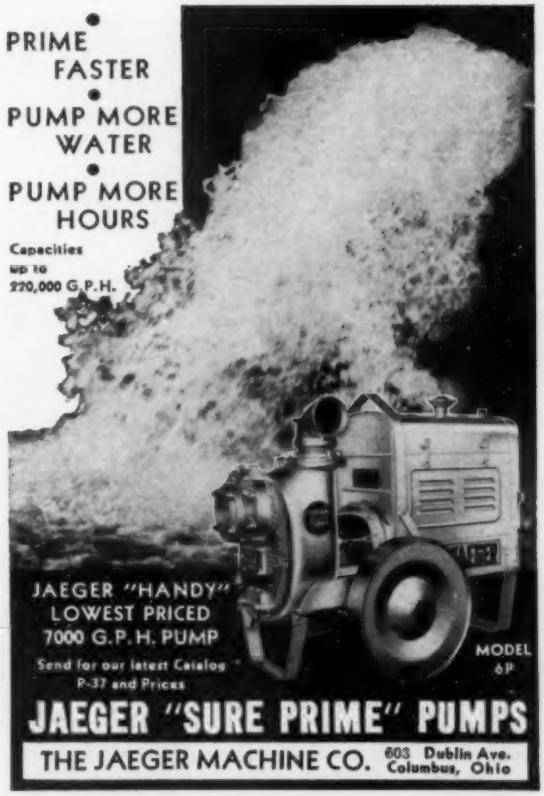
Capacities up to 220,000 G.P.H.



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SAND AND GRAVEL	CEMENT
Dorr Classifiers	Dorr Slurry Mixers
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FURNISHED IN THREE CONVENIENT SIZES

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9 ft. dia.	40-80 tons per hr.
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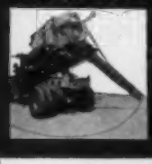

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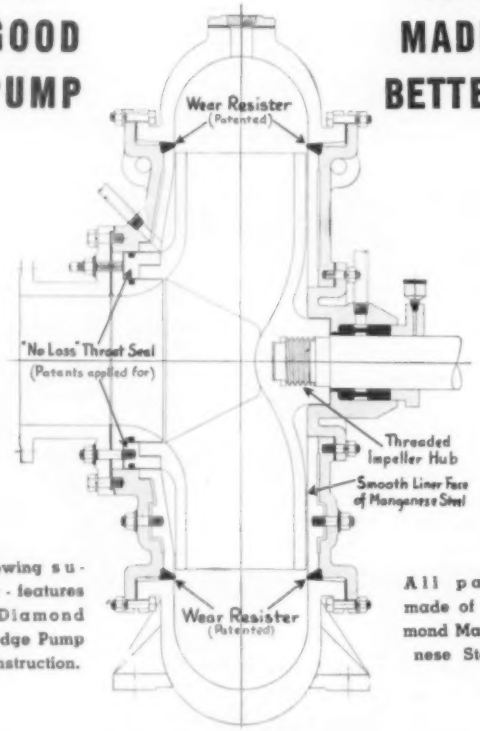

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All parts made of Diamond Manganese Steel.

DIAMOND DREDGE PUMPS

now give their users even better performance because of newly developed features. Operators can now produce material at a still lower cost.

The patented "Wear Resister" protects pump shell, side plates and liners from wear at vital points. Threaded Impeller Hub or Bore gives greater impeller throat clearance and insures a true running impeller at all times. "No Loss" Throat Seal prevents internal leakage. P. M. Co. Products include Traveling Chain Cutter, Rotary Cutters, Elbows, Flap Valves, Nipples, Jaw Plates, Crusher Parts, Dippers, Dipper Teeth, Sheaves, and other Manganese Steel Products.

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Normal, all-purpose, masonry, plastering and stuccoing cements under the several BLANK patented processes.

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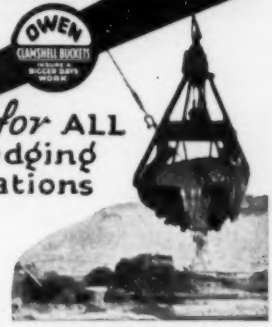

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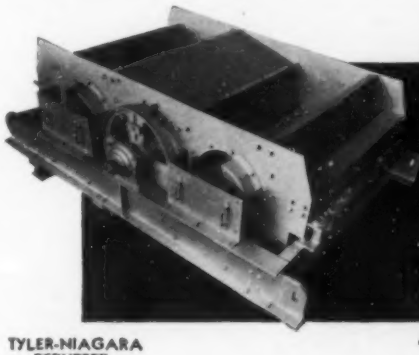
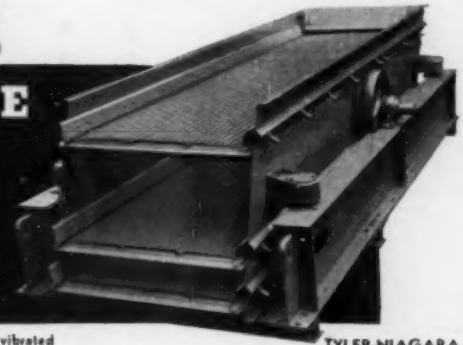
AGGREGATE Screening and Washing Machinery



TYLER-NIAGARA SCRUBBER



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We have just purchased a complete plant at Boston and will sell as a whole or separately the following:

1—24x36" Bacon-Farrel Jaw Crusher.
1—4' Symons Cone Crusher. New 1932.
1—100 H.P. 3/60/440 Slipring Motor; also 25 H.P. and 50 H.P.
2—3x6' Niagara 2-deck Screens.
1—24" Bucket Elevator, 75' centers.
1—500 CFM I-R Air Compressor.
1—20-ton Truck Scale.

Another small complete plant for sale as a whole or separately:

1—9x15 Austin Western Crusher.
1—35' Steel Bucket Elevator.
4—3'x6' Sturtevant M V Screens.
1—No. 1 Sturtevant Ring Roll Mill.
1—42"x25' Calciner, with gear reducer, motors, pyrometer, etc.
1—2x8' type No. 100 Tyler Niagara Screen, two-deck.
1—Dings Magnetic Separator, latest style, type "B", No. 0.
1—Tyler Rotex Screen, with 23 sieves.
3—Log Washers, 14"x18'.
All motor driven—also miscellaneous equipment.

3—4'x8' Allis-Chalmers Screens, 2-deck.
1—3'x6' Niagara Screen, 2-deck.
3—4x5' Tyler Screens No. 31, 2 and 3 deck.
1—24x24" Link Belt Single Roll Crusher.
1—5-roll Raymond High Side Mill.
7—Hardinge Iron Lined Ball Mills; 3'x8", 4½'x16", 6'x16", 6'x22", 8'x22", 8'x30".
2—6'x22' Iron Lined Tube Mills.
1—3'x12' Hendy Iron Lined Tube Mill.
5—Ruggles-Coles, Class A, Direct Heat Rotary Dryers; 5'x26', 5'x30', 80"x40', 70"x45'.
11—Rotary Kilns; 42"x25', 6'x60', 7x100', 8'x110', 8x125', 9'6"x150'.

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What do you wish to sell? Send us details.

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15-16-17 Park Row **New York, N. Y.**
Plant and Shops at Newark, N. J., cover 8 acres of ground.

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25—40 ton steel u/f flats.
20—50 ton steel u/f flats.
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200—30 ton steel u/f box cars.
75—30 ton steel u/f stock cars.
75—50 ton all-steel gons.

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1—15-20 ton Link-Belt. 50 ft. boom.
1—20 ton Ohio. 50 ft. boom.
1—20 ton Browning No. 8. 50 ft. boom.
1—30 ton Ohio. 50 ft. boom.
1—40 ton Brownhoist. 60 ft. boom.
1—50 ton Wrecker type crane. 50 ft. and 90 ft. booms.

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1—25 ton Baldwin. Std. Ga.
1—32 ton American. Std. Ga.
1—40 ton Baldwin. Std. Ga.
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3—Vulcan, 13x20 yds. Std. Ga.
1—18 ton gas-electric. Std. Ga.

Narrow Gauge Dump Cars & Locomotives. Standard Gauge Dump Cars & Switch Engines

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2—500 ft. Worthington Steam Air Compressors.
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3—No. 50 Ingersoll-Rand Drill Sharpeners.
16—Steam Hoists, 6x8 to 10x12.
12—Electric Centrifugal Pumps, 2 to 8 inch.
6—High Head Gasoline Pumps.
½ yd., ¾ yd., 1 yd., 1¼ and 1½ yd. Hayward & Williams Clamshell Buckets.
3—Ingersoll-Rand Aftercoolers.
10 Ton Erie 40' boom Steam Cat. Crane.
150 H.P. Hall-Scott Gasoline Engine.
5—Steam Engines 10 to 70 H.P.
3—37H.P. American Elec. 2 Drum Hoists with attached swingers.
1—No. 49 Kennedy Gyratory Crusher.
1—10x20 Climax Jaw Crusher.
¼, ½, ¾ and 1 yd. Concrete Mixers.
7—Steam Derrick Swinging Engines.
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2—300 H.P. DeLaVergne Diesel Engines.
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Real Bargains—Priced Right

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1—Simonds Disc crusher, type "B", 36", Shop No. 154.
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1—6x60 Cooler or Dryer, with channel flights.
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1—4x8 Traylor large size Sheridan Shaking Grizzley, never used.
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2—Deane Steam Pumps, size 7½"x8½" x6", Serial Nos. 81900 and 82325.
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2—Type A Jeffrey Hammer Mills, 24" x18".
1—Fay & Egan Band Saw No. 192.

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3—100 HP Westinghouse, 585 RPM, type CCL.
1—50 HP Westinghouse, 585 RPM, type CCL.
3—30 HP Westinghouse, 690 RPM, type CCL.
1—50 HP Allis-Chalmers, 865 RPM.
1—50 HP General Electric, 865 RPM.
3—40 HP Allis-Chalmers, 865 RPM.
1—235 HP Synchronous General Electric, 600 RPM, with outboard bearing and pulley.

Large assortment of pulleys of various sizes.

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BUCKETS—CLAMSHELL:
1—1¼ yd. Rehandling fast operating type (also ½ and ⅝ yard).
1—1 yd. Blaw Knox Dreadnaught No. 611 rehandling type.
COMPRESSORS—PORTABLE:
3—110 cu. ft., 3—220 cu. ft., 1—310 cu. ft.
COMPRESSORS—STATIONARY:
2—664 cu. ft. CP. 15—9x10 type VC Diesel Engine.
CRANES & SHOVELS:
1—1¼ yd. Browning full revolve gas crawler crane.
1—½ yd. Austin simplex full revolve gas crawler shovel 40' crane boom.
1—Lidgerwood Otis type "A" Tractor Crane mounted on McCormick-Deering "20" Tractor solid R.P. wheels.
MIXER—TRUCK:
1—2 yd. Jaeger, rear dis. truck mixer.
PUMPS:
3—2x2 LaBour self prime elec. motors.
3—6x6 Mario self prime.
ROLLERS:
1—10 ton Austin 3 wheel gas roller. Autocrat model.
1—10 ton Huber 3 wheel gas roller.
1—5 ton Huber 3 wheel gas roller.
TRACTORS:
1—T D 40 Diesel International Trac Tractor with hydraulic bulldozer and trail builder.
1—Caterpiller "60" with crawler tracks and bulldozer—canopy.
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36", 36" & 42" McCully Gyratory Crushers, 30" Kennedy, No. 16 Telsmith and other Gyratories Nos. 3, 4, 5, 6, 7½, 8, 9 & 10.
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Fire-Roll Low-Side Raymond Mill.
10" AMSCO Tr. M. Dredging Pump.
Dragscraper Outfits—1, 2 & 4-yd.
5'x36' Direct Heat Revolving Dryer.
30"x463' c.c. Conveyor System complete.
10-ton Dravo Steam Whirler.
4—Derrick Outfits, bucket-handling.
Athey side-dump rock wagons, 14-yd.
Caterpillar "75" Diesel Tractors.
1—Double Pumpcrete Machine.
3½-yd. P&H Diesel Shovel, Model 900.

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2 100-B Bucyrus-Erie steam shovels, worked only 15 months. Also, 2 Ingersoll-Rand Diesel compressors. Very low prices for immediate sale.

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POWER UNITS

1—60-hp. Allis Chalmers gasoline engine
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Both in first class condition

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14 & 20 ton Whitcomb Gaso. Locomotives.
16" & 36" McCully and Kennedy Gyratory.
600 and 1200 ft. 100 lb. Air Compressors.
30, 100, 150, 360 HP Fairbanks Diesels.
2 and 3 Drum Hoists. Gaso., Elec., Steam.
10 & 20 ton Steel Derricks. 75 to 100' Boom.
5'x22' Tube Mills. 6½' Rotary Coolers.
142' & 232' Rotary Kilns. 32' Rotary Dryers.

MISSISSIPPI VALLEY EQUIPMENT CO.
515 Locust St. **St. Louis, Mo.**
"Try us whenever Buying or Selling"

This picture shows a 2 cu. yd., 700-ft. span Sauerman Slackline Cableway digging 150 tons of gravel per hour from a deep, wet pit. Material is handled in a straight-line operation to top of plant at cost of few cents per ton.

SAUERMAN
LONG RANGE MACHINES

In the Sauerman line of Drag Scrapers, Slackline Scrapers and Cableway Excavators there are machines to solve every problem—large or small—in pit or bank excavation, river dredging, stripping overburden, storing and reclaiming sand, gravel, crushed stone, etc. Several hundred installations of different sizes and types are illustrated and described in our new Catalog 18. Write for your copy of this catalog now.

SAUERMAN BROS., 430 S. Clinton St., Chicago

Above is illustrated one of the various ways of using Sauerman Drag Scrapers for storing and reclaiming materials on ground alongside plant. A drag scraper is the most economical and flexible equipment for storage work.

MANGANESE STEEL CASTINGS

—FOR—
CRUSHERS
PULVERIZERS
ROLLS
SCREENS

—FOR—
SHOVELS
DREDGES
CRANES
CONVEYORS

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Established 1881 Carlisle, Pa.

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CENTRIFUGAL PUMPS

For handling abrasive materials, corrosive liquids, or clear water. Special designs and materials for each service to provide long life, maintenance of initial high efficiency and low upkeep cost.

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MORRIS MACHINE WORKS • BALDWINSVILLE, N.Y.

SYMONS
CRUSHERS • SCREENS

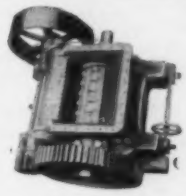
FINER PRODUCT
GREATER CAPACITY
LOWER CRUSHING COST

These advantages have made Symons Cones first among reduction crushers.

SIZES CLOSER
SAVES HEADROOM
ACTION IS POSITIVE

The trend is definitely toward level screening. Again Symons leads the way!

NORDBERG MFG. CO., MILWAUKEE WISCONSIN



McLANAHAN EQUIPMENT

CRUSHERS

Single and double roll and jaw crushers, hammer mills, super dry pans—steel log washers and scrubbers, sand drags, revolving and vibrating screens, elevators, conveyors, dryers, jigs, hoists.

SCREENS

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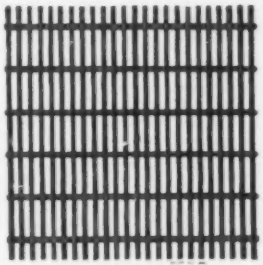

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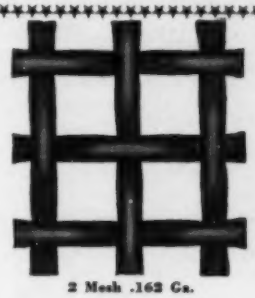

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Portable and stationary, belt with elec. or gas power, sizes from 21 cu. ft. to 1,000 cu. ft.

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1—4 yd. Hayward Class "G" clamshell.
36—Williams, Blaw Knox, Owen clamshell buckets, all sizes and types.
4—Dragline buckets: 1—Northwest 1⅝-yd.; 2—Page 1½-yd.; 1—Blaw Knox 1-yd.

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Large lot, including std. ga. 6 & 12-yd., & 20-yd., 36-in. ga. 5-yd. & 24-ga. 1½-yd.
14—2-yd. 36-in. ga. Continental 2-way wood body dump cars.

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1—Koehring model 501 dragline, ser. No. 1079, 45′ boom, 1⅛-yd. bucket.
1—Northwest model 104, ser. No. 2079, 45′ boom, 1⅛-yd. bucket.
1—Moore Speed crane, No. 179, 65′ boom, 1-yd. bucket.
1—Osgood heavy duty dragline, ser. No. 2069.
1—Byers Bearcat crane model 26, ser. No. 29474, half circle swing, ½-yd. bucket.
1—Erie type B-2 No. 3900 steam crane, 40′ boom, 1-yd. bucket.

SPECIAL 1—Link Belt K-55 Dragline No. 1698 —70′ boom, 2-yd. bucket.
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1—25 ton Clyde all steel Stiff Leg Derrick with 50′ boom, 30′ mast, legs & sills in proportion, 12′ dia. bullwheel, for hook work or clamshell operation.
1—15 ton Clyde, all steel Stiff Leg Derrick, 50′ boom, duplicate of above.
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1—15 ton Clyde, all steel, "A" frame, barge derrick with 50′ boom, 30′ mast, 12′ dia. bullwheel, for hook work or bucket operation.

DERRICKS (Guy)

10—American, all steelguy derrick with 115′ mast, 100′ boom, with bull wheel, for hook work or clamshell; 2—20 ton, 8—15 ton.
4—Bedford 6 ton cap., all steel guy derricks, with 90′ mast, 80′ boom, with bullwheel, for hook work or clamshell.

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6—Wagon drills, Ingersoll Rand & Gardner-Denver, with 1R X71 & GD 17 & 21 drills.

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1—Barber Greene model 42-A.
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6—Electric storage battery type, 4 ton 24″ ga. with battery boxes; 4—Whitcomb; 2—Atlas.
22—Gas locomotives: 6—8 ton Vulcan, std. ga.; 2—7 & 8 ton Whitcomb—36″ ga.; 3—4 ton Vulcan & Davenport, Gear drive, 36″ ga.; 1—4 ton Plymouth, friction drive, 36″ ga.; 7—7 ton Whitcomb & Plymouth, gear drive 24″ ga.; 3—Plymouth 4 ton 24″ ga.

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4—10″ Allis Chalmers centrifugal pumps, direct connected to 200 HP, 440 V., A.C. motors; cap. 3500 GPM, 175′ head.

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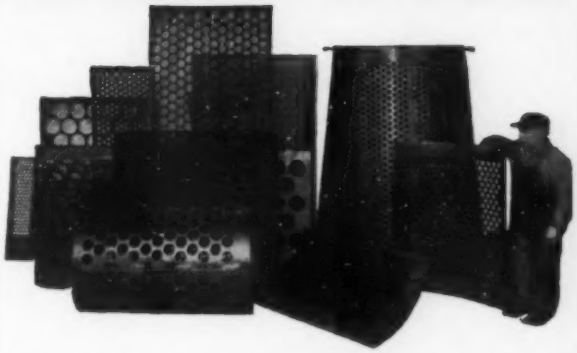

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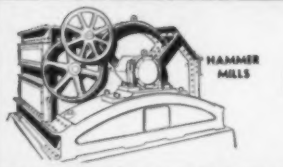

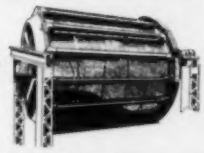

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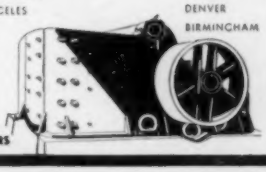

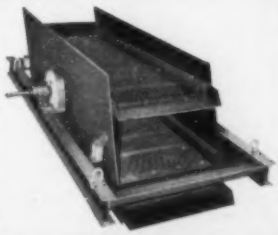

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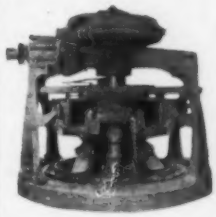

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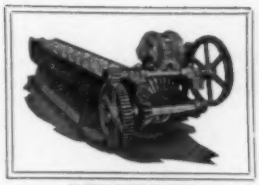

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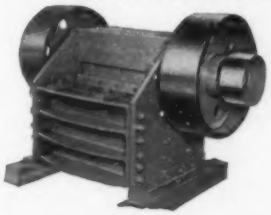

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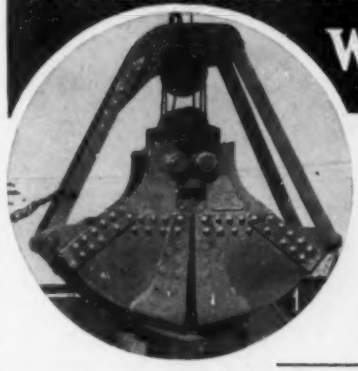

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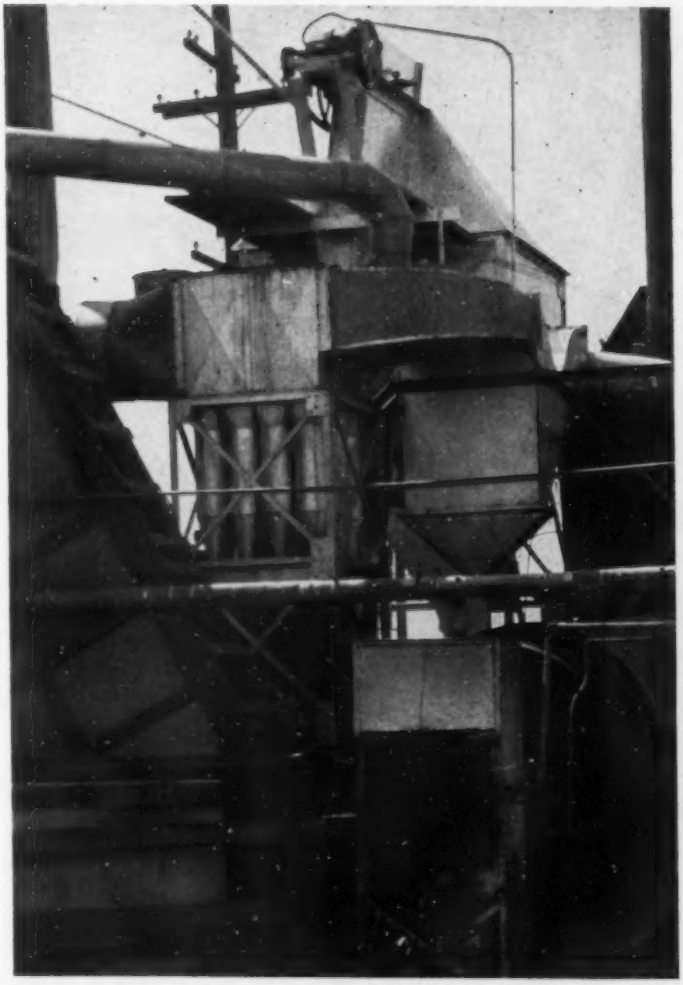

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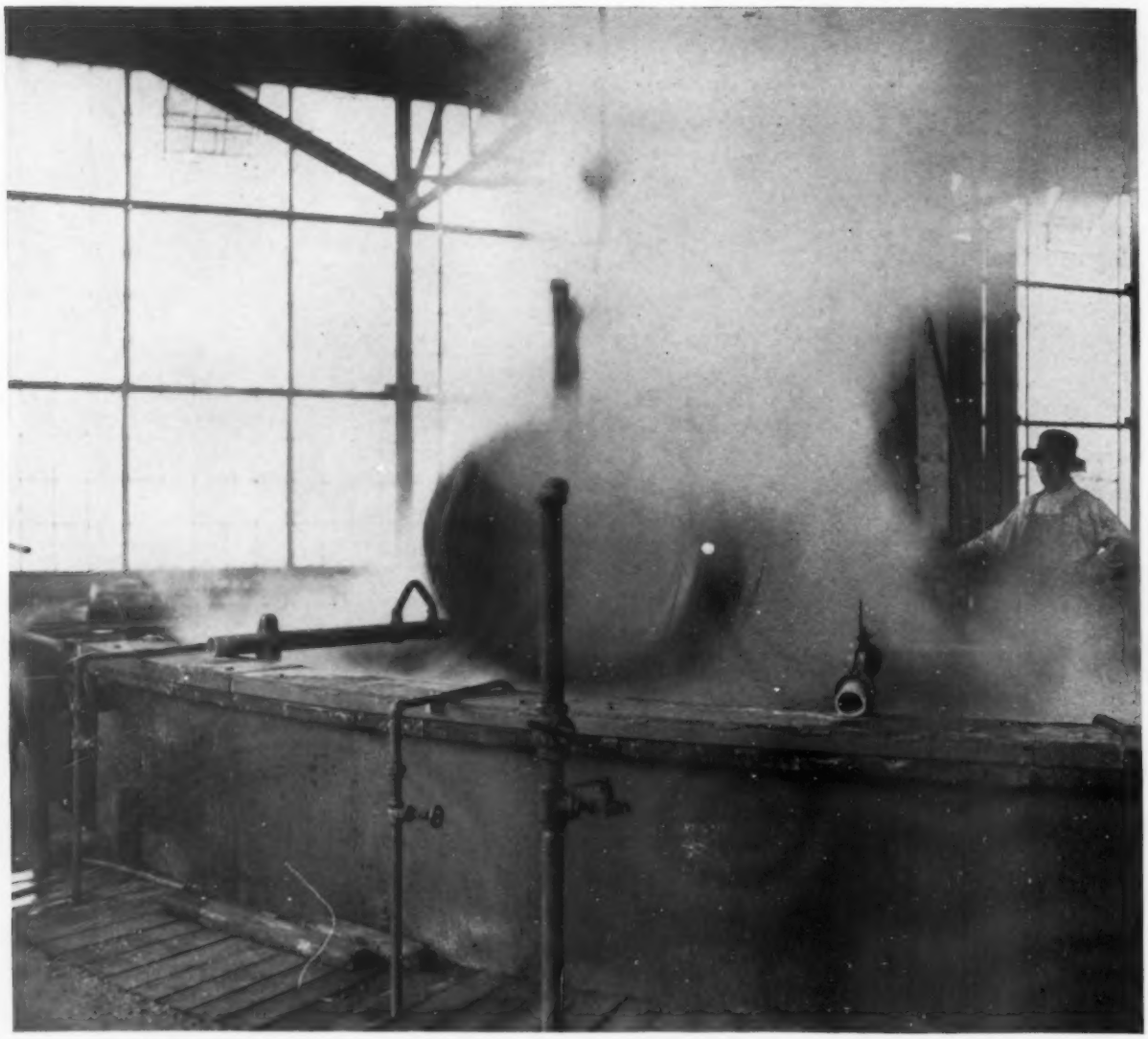

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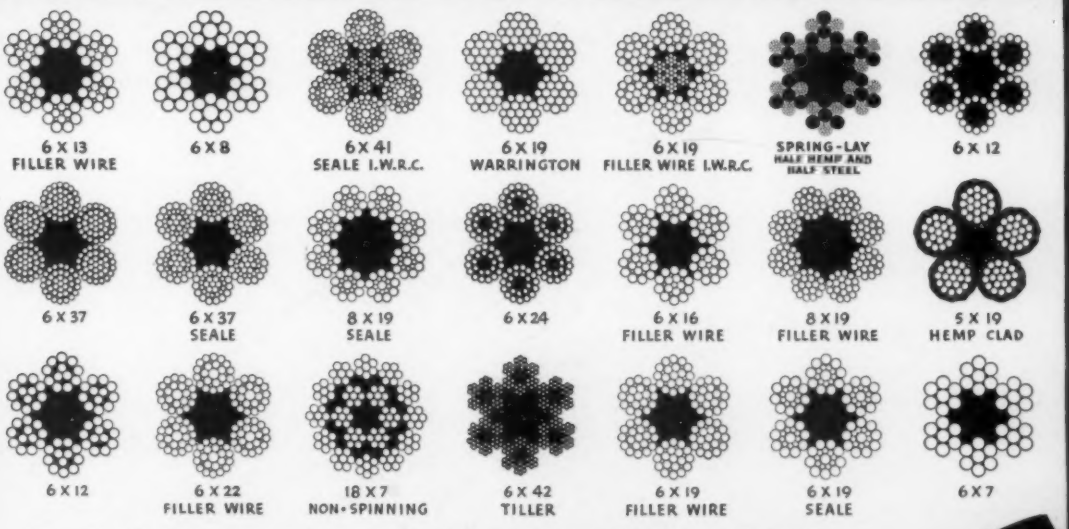
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8 X 19 SEALE
6 X 24
6 X 16 FILLER WIRE
8 X 19 FILLER WIRE
5 X 19 HEMP CLAD
6 X 12
6 X 22 FILLER WIRE
18 X 7 NON-SPINNING
6 X 42 TILLER
6 X 19 FILLER WIRE
6 X 19 SEALE
6 X 7

Typical Constructions of HAZARD WIRE ROPES

BUY ACCO QUALITY

91 YEARS *of Integrity*

● Wire rope manufacture demands engineering skill and precision methods plus *integrity* of purpose. Erskine Hazard realized this when he started making wire rope in 1846. Throughout his life he demanded of his associates the intangibles of character, honesty, truth. That he was successful is found in the fact that many customers have bought Hazard ropes *continuously* for 30, 40 and 50 years. Hazard was the first to obtain a license to manufacture preformed wire rope—introducing "Lay-Set" Preformed in 1928. And in 91 years of endeavor, Lay-Set Preformed has been our most successful rope. Here is a rope that has high fatigue resistance; resists kinking; handles easily; lasts longer. Write for full details.

HAZARD WIRE ROPE DIVISION

ESTABLISHED 1846

AMERICAN CHAIN & CABLE COMPANY, Inc.

WILKES-BARRE, PENNSYLVANIA

District Offices: New York, Chicago, Philadelphia, Pittsburgh, Ft. Worth, San Francisco, Denver, Los Angeles, Birmingham, Tacoma

In Business for Your Safety

GREEN SIGNIFIES SAFETY

A FEW OF THE 137 AMERICAN CHAIN & CABLE INDUSTRIAL PRODUCTS

AMERICAN CHAIN DIVISION
(DOMINION CHAIN COMPANY, Ltd., in Canada)
Weed Tire Chains • Welded and Weldless Chain • Malleable Castings • Railroad Specialties

ANDREW C. CAMPBELL DIVISION
Abrasive Cutting Machines • Floformers Special Machinery • Nibbling Machines

FORD CHAIN BLOCK DIVISION
Chain Hoists • Trolleys

HAZARD WIRE ROPE DIVISION
Green Strand Wire Rope • "Korodless" Wire Rope • Preformed Spring-Lay Wire Rope • Guard Rail Cable

HIGHLAND IRON & STEEL DIVISION
Wrought Iron Bars and Shapes

MANLEY MANUFACTURING DIVISION
Automotive Service Station Equipment

OWEN SILENT SPRING COMPANY, Inc.
Owen Cushion and Mattress Spring Centers

PAGE STEEL AND WIRE DIVISION
Page Fence • Wire and Rod Products Traffic Tape • Welding Wire

READING-PRATT & CADY DIVISION
Valves • Electric Steel Fittings

READING STEEL CASTING DIVISION
Electric Steel Castings, Rough or Machined

WRIGHT MANUFACTURING DIVISION
Chain Hoists • Electric Hoists and Cranes

ACCO

LAY-SET *Preformed* WIRE ROPE

✲ ALL HAZARD WIRE ROPES MADE OF IMPROVED PLOW STEEL ARE IDENTIFIED BY THE GREEN STRAND

BUCYRUS-ERIE

ALL-WELDED BOOM

Greater strength--less weight

There is no unnecessary weight on this famous Bucyrus-Erie quarry and mining shovel. Its strong, simple, box-girder boom is welded into a single unit from the boom foot to the point. The combination of a lighter front-end and consequent lighter counterbalance means less swing-ing load, faster starting and stopping — a high-speed, big output shovel that stands up to any kind of digging.

BUCYRUS ERIE

EXCAVATING, DRILLING, AND MATERIAL HANDLING EQUIPMENT... SOUTH MILWAUKEE, WISCONSIN, U.S.A.